

THE IRON AGE

Published every Thursday Morning by David Williams Co., 14-16 Park Place, New York.

Vol. 79: No. 23.

New York, Thursday June 6, 1907

\$5.00 a Year, including Postage.
Single Copies, 15 Cents.

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ESTES Shaft Couplings



M'fd by Foster Pulley Works, Cuba, N. Y.

The American Mfg. Co.
Ropes and Twines
65 Wall Street, New York

Bristol's Patent Steel Belt Lacing



THE BRISTOL CO., Waterbury, Conn.
New York: 114 Liberty Street
Chicago: 753 Monadnock Building

SAMSON SPOT CORD



Also Massachusetts and Phoenix
See page 230 Brands
SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES



Branch Office, 11 Broadway, New York.
Cleveland City Forge and Iron Co., Cleveland, O.

TURNBUCKLES



MERRILL BROS.,
465 to 471 Kent Ave.,
Brooklyn, E.D., N.Y.

COKE PILLING & CRANE
Girard Building, Philada.
Machesney Bldg., Pittsburg
Empire Bldg., New York

TIME IS MONEY

and by the use of

**Apollo
Best Bloom
Galvanized Sheets**

you save time in construction
and cost of repairs.

See
AMERICAN
SHEET & TIN PLATE
COMPANY'S
Ad. on Page 17.

HAMMERLESS, SOLID BREECH



SHOTGUN
BUTT

HAS SAFE SAFETY
EASILY OPERATED
BY SENSE OF
FEELING

IT LOADS ITSELF AND BREECH
REMAINS OPEN AFTER LAST SHOT.
HAS BOX MAGAZINE AND LOADS
WITH CLIP IN 1/2 SECOND.

USES RIFLE CARTRIDGES OF GREAT POWER

HAS PLEASING LINES;
PERFECT FINISH,
CORRECT BALANCE,
SIMPLE TAKE-DOWN.

POINTS THAT SELL THE
Remington
AUTOLOADING RIFLE

You can easily point out in a Remington Autoloading Rifle the features that appeal to a big game hunter. All of the good qualities of the old style big game rifle combined with wonderful rapid fire execution—5 knock-down blows in a second. Do you buy big game rifles to sell? Remingtons sell themselves.

Agency: 315 Broadway, New York City
Remington Arms Co.
Hilou, N. Y.
Sales Office: 515 Market Street, San Francisco, Cal.

**WATER TUBE
BOILERS**

The Babcock & Wilcox Co.
85 Liberty Street
New York
See page 70

**THE LARGE AND STEADILY IN-
CREASING DEMAND FOR**

"THE CAPEWELL" HORSESHOE NAIL

Is attracting wide attention among HARDWARE DEALERS who appreciate the fact that a large demand results in QUICK SALES; quick sales in more frequent DIVIDENDS, and a higher annual RATE OF INTEREST upon every dollar invested.

Made by

The Capewell Horse Nail Co., Hartford Conn.



JENKINS BROS. VALVES

do not require constant regrinding. When necessary to repair, a new Disc will usually make the valve as good as new. Jenkins Discs are inexpensive, and can be readily applied by any one without taking valve from the pipe. All parts interchangeable. Write for booklet.

All genuine bear Trade Mark as shown in cut.

JENKINS BROS., New York, Boston, Philadelphia, Chicago.

"Swedoh" Cold Rolled Steel is unex- Drawing and Stamping
THE AMERICAN TUBE & STAMPING COMPANY
Water and Rail Delivery) BRIDGEPORT, CONN. SEE PAGE 25



MAGNOLIA METAL
Best Anti-Friction Metal for all Machinery Bearing.

Fac-Simile of Bar.
Beware of
Imitations.

MAGNOLIA METAL CO.

Owners and Sole Manufacturers.
Chicago, Fischer Bldg.

113-115 Bank Street,
NEW YORK.

San Francisco, Montreal and Pittsburg.
We manufacture all grades of Babbitt
Metals at competitive prices.

TIN PLATE AND SHEET STEEL

FOR
DEEP STAMPING
AND
DRAWING

**FOLLANSBEE
BROTHERS
COMPANY
PITTSBURGH**

BRASS { SHEET
ROD
WIRE
COPPER { SHEET
ROD
WIRE
**GERMAN
SILVER** { SHEET
ROD
WIRE

LOW BRASS, SHEET BRONZE,
SEAMLESS BRASS AND COPPER
TUBING, BRAZED BRASS AND
BRONZE TUBING : : : :

WATERBURY BRASS CO.,

WATERBURY, CONN.

99 John St., New York. Providence, R. I.

**Bridgeport Deoxidized Bronze
& Metal Co.**

BRIDGEPORT, CONN.

Phosphor and Deoxidized
Bronze

Composition, Yellow Brass and Alumi-
num Castings, large and small

Matthiessen & Hegeler Zinc Co.,

LA SALLE, ILLINOIS.

SMELTERS OF SPELTER

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc cut to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

**BRASS FOUNDERS
FINISHERS J.J. RYAN & CO.**

105-109 So. Jefferson St., Chicago.

Best Bronze, Babbitt Metals, Brass and Aluminum CASTINGS
On Short Notice

GERMAN SILVER | NICKEL ANODES

BRASS, BRONZE, and COPPER

The Seymour Mfg. Co., - - Seymour, Conn.

HENDRICKS BROTHERS

PROPRIETORS OF THE

Belleville Copper Rolling Mills,

MANUFACTURERS OF

Braziers' Bolt and Sheathing

COPPER,

COPPER WIRE AND RIVETS,

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.

49 CLIFF ST., NEW YORK.

The Plume & Atwood Mfg. Co.
MANUFACTURERS OF

**Sheet and Roll Brass
AND
WIRE**

Printers' Brass, Jewelers' Metal,
German Silver and Gilding Metal,
Copper Rivets and Burrs. - - -

Pins, Brass Butt Hinges, Jack Chain, Kerosene
Burners, Lamps, Lamp Trimmings, &c.

279 Broadway, NEW YORK.

Room 508 Heyworth Building, East Mad-
ison St., CHICAGO, ILL.

Rolling Mill THOMASTON, CONN. Factories: WATERBURY, CONN.

SCOVILL MFG. CO.

MANUFACTURERS OF

BRASS,

GERMAN SILVER,

Sheets Rolls, Wire Rods,

Bolts and Tubes,

Brass Shells Cups, Hinges,

Buttons, Lamp Goods.

Special Brass Goods to Order.

FACTORIES:

WATERBURY, CONN.

DEPOTS:

NEW YORK. CHICAGO. BOSTON.

Henry Souther Engineering Co.

HARTFORD, CONN.

**Consulting Chemists, Metallur-
gists and Analysts.**

Complete Physical Testing Laboratory.
Expert Testimony in Court and Patent Cases.

Arthur T. Rutter & Co.

256 Broadway

NEW YORK

Small tubing in Brass, Copper,
Steel, Aluminum, German Silver,
&c. Sheet Brass, Copper and Ger-
man Silver. Copper, Brass and
German Silver Wire. Brazed and
Seamless Brass and Copper Tube.
Copper and Brass Rod.

**"PHONO-ELECTRIC"
WIRE. "IT'S TOUGH."**

**TROLLEY,
TELEPHONE
and
TELEGRAPH
LINES.**



Mills
Bridgeport
Conn.

BRIDGEPORT BRASS COMPANY

Postal Telegraph Bldg.
Broadway and Murray St., New York



PHOSPHOR-BRONZE

GERMAN SILVER

THE RIVERSIDE

METAL CO.

RIVERSIDE, N. J.

1.

Stoppers, Bottle—

Victor Bottle Stoppers. 50 gro. \$9.00

Stops—Bench—

Millers Falls. 15-10%

Morrill's, No. 1. \$10.00. 50%

Morrill's, No. 2. \$12.50. 50%

Door—

Chapin-Stephens Co. 60-60-10%

Chapin-Stephens Co. 20%

Plane—

Cary's Universal, case lots. 20-10-10%

Stretchers, Carpet—

Cast Iron, Steel Points, dos. 60-60-10%

Socket. 50 doz. \$1.00

Excelsior Stretcher and Tack Hammer Combined. 50 doz. \$2.00. 20%

Woven Fence—

Franklin. 50 doz. \$3.75

Strops, Razor—

Star Diagonal Strop. 25%

Stuffers, Sausage—

Enterprise Mfg. Co. 25-25-14%

National Specialty Co., list Jan. 1, 1902. 30-5%

Sweepers, Carpet—

Bissell Carpet Sweeper Co. 50 doz.

Superba, Crotch Mahogany. \$36.00

Triumph, Fancy Veneers. \$33.00

Parlor Queen, Figured Rosewood. \$30.00

Elite, Hungarian Ash. \$28.00

American Queen, Figured Mahogany. \$27.00

Ideal, Bird's-Eye Maple. \$25.00

Grand Rapids, Nickel. \$24.00

Japan. \$22.00

Standard, Nickel. \$22.00; Japan. \$20.00

Crown Jewel, Nickel. \$21.00

Japan. \$19.00

Crystal, Glass Top. \$18.00

Grand, 17 in. wide. \$16.00

Club, 24 in. wide. \$14.00

Hall, 28 in. wide. \$10.00

National Sweeper Co. 50 doz.

Louis XV, Roller Bearing, Gold Plated. \$128.00

Hepplewhite, Roller Bearing, Silver Plated. \$72.00

Sheraton, Roller Bearing, Nickel. \$60.00

Ye Mission, Roller Bearing, Oxidized Coppered. \$36.00

Transparent, Roller Bearing, Plate Glass top, Nickel. \$36.00

National Queen, Roller Bearing, Fancy Veneers. \$27.00

Loyal, Roller Bearing, Veneers, Nickel. \$25.00

Triple Medal, Roller Bearing, Nickel. \$24.00

Marion, Roller Bearing, Nickel. \$24.00

Marion Queen, Roller Bearing, Nickel. \$24.00

Monarch, Roller Bearing, Nickel. \$24.00

Monarch, Roller Bearing, Japan. \$20.00

Perpetual, Regular B'rgs, Nickel. \$20.00

Perpetual, Regular B'rgs, Japan. \$18.00

Monarch Extra (17 in. case), Roller Bearing, Nickel. \$33.00

Auditorium (26 in. case), Roller Bearing, Nickel. \$54.00

Mammoth (30 in. case), Roller Bearing, Nickel. \$60.00

NOTE—Rebates: 50c per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$3.50 per dozen on twenty-five-dozen lots; Streator Metal Stamping Co.

Eureka Japanned. 50 doz. \$15.00

Model E, Sanitaire. 50 doz. \$25.00

Model A, Sterling. 50 doz. \$25.00

Model B, Sterling, Nickel. 50 doz. \$25.00

Model B, Sterling, Japanned. 50 doz. \$21.00

Model C, Sterling. 50 doz. \$21.00

Model D, Sterling. 50 doz. \$19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks. 90-90-30%

American Cut Tacks. 90-90-30%

Swedes Cut Tacks. 90-90-30%

Swedes Upholsterers. 90-90-30%

Gimp Tacks. 90-90-30%

Lace Tacks. 90-90-30%

Trimmers' Tacks. 90-90-30%

Looking Glass Tacks. 65%

Bill Posters' and Railroad Tacks. 90-90-30%

Finishing Nails. 70%

Trunk and Clout Nails. 80%

NOTE—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10-15% is given on light weights.

Miscellaneous—

Double Pointed Tacks. 90-90-30%

See also Nails, Wire.

Tanks, Oil and Gasoline—

R. M. Co. Oil Emerald Queen City

30 \$3.40 \$3.65

60 \$4.25 \$4.50

Wilson & Friend Co. Oil

Gal. Gasoline \$3.00

30 \$2.75 \$3.00

60 \$3.50 \$3.75

120 \$5.00 \$5.75

Tapes, Measuring—

American Asnes' Skin. 50-50-10%

Patent Leather. 50-50-10%

Steel. 50-50-10%

Chesterman's. 50-50-10%

Keuffel & Esser Co. 40-10-10%

Favorite, Ass Skin. 40-10-10%

Favorite, Duck and Leather. 25-50-10%

Metallic and Steel, lower list. 35-50-10%

35-50-10%; Pocket. 35-50-10%

Lufkin's:

Ames' Skin. 40-10-10%

Metallic. 30-30-10%

Patent Bend, Leather. 25-50-10%

Pocket. 40-40-10%

Steel. 33-33-10%

Wieland & Hilger: 33-33-10%

Chesterman's Metallic, No. 34L. 25%

Chesterman's Steel, No. 1038L. 35%

etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 5/8-inch and larger. 25%

per 100 lbs. \$2.75 @ \$3.00

Thermometers—

Tin Case. 80-10-10%

Ties, Bale—Steel Wire—

Single Loop. 80-10-10%

Monitor, Cross Head, 7/8-2 1/2. 25%

Brick Tiles—

Niagara Brick Tiles. 25-10%

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Plated, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White. 20-20-5%

Haying—

Myers' Hay Tools. 45%

Stowell's Hay Carriers, 50% Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co's, Davidson. 25%

Saw—

Atkins' Cross Cut Saw Tools. 35-45%

Simonds' Improved. 30%

Simonds' Crescent. 25%

Ship—

L. & I. J. White. 25%

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.50 @ \$1.25; gro. \$11.50 @ \$12.00

Harper, Champion or Paragon, doz. \$1.25 @ \$1.40; gro. \$13.00 @ \$13.50

Game—

Imitation Onocida. 70-10%

Newhouse. 40-40-10%

Hawley & Norton. 65%

Victor. 70-10%

Onocida Community Jump. 50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12c

Mouse, Round or Square Wire, doz. 85 @ 90c

Marty French Rat and Mouse Traps (Genuine):

No. 1, Bat, 50 doz. \$13.25; case of 24. \$11.50 doz.

No. 3, Rat, 50 doz. \$6.50; case of 50. \$5.75 doz.

No. 3 1/2, Bat, 50 doz. \$5.25; case of 72. \$4.75 doz.

No. 1, Mouse, 50 doz. \$3.25; case of 150. \$3.00 doz.

No. 5, Mouse, 50 doz. \$3.00; case of 150. \$2.50 doz.

Trimmers, Spike—

Wood's E 1. 50%

Trowels—

Diston Brick and Pointing. 25%

Diston Plastering. 20%

Diston "Standard Brand" and Garden Trowels. 20%

Kohler's Steel Garden Trowels, 5 in. \$4.00; 6 in. \$4.50.

Never-Break Steel Garden Trowels. 50%

Rose Brick and Plastering. 25-45%

Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co. 50-40-10%

New York Pattern. 50-40-10%

Western Pattern. 40-40-10%

Handy Trucks. 50 doz. \$15.00

Grocery. 50 doz. \$15.00

Daisy Stove Trucks, Improved Pattern. 50 doz. \$18.50

McKinney Trucks. 50 doz. \$18.00

Model Store Trucks. 50 doz. \$18.00

Tubs, Wash—

M'Far's list, price per gross.

No. 0. 7 1/2 8 1/2 10 1/2 12 1/2

Galvanized, \$6.75 \$7.25 \$8.00 \$8.50

Galvanized Wash Tubs (B. M. Co.):

No. 1. 2 3 10 20 30

Per doz., net. \$3.70 6.30 7.20 6.00 7.20 8.10

Twine, Miscellaneous—

Flax Twine:

No. 9, 1/4 and 1/2-lb. Balls. 21 @ 25c

No. 12, 1/4 and 1/2-lb. Balls. 21 @ 22c

No. 18, 1/4 and 1/2-lb. Balls. 18 @ 20c

No. 24, 1/4 and 1/2-lb. Balls. 17 @ 19c

No. 36, 1/4 and 1/2-lb. Balls. 16 @ 18c

Chalk Line, Cotton. 1-lb. Balls. 26 @ 31c

Cotton Mops, 6, 9, 12 and 15 lb. to doz. 11 @ 19c

Cotton Wrapping, 5 Balls to lb. according to quality. 15 @ 23c

American 2-Ply Hemp, 1/4 and 1/2-lb. Balls. 14 @ 15c

American 3-Ply Hemp. 1-lb. Balls. 15 @ 16c

India 2-Ply Hemp, 1/4 and 1/2-lb. Balls (Spring Twine). 10 @ 11c

India 3-Ply Hemp, 1-lb. Balls. 10 @ 11c

India 3-Ply Hemp, 1/4-lb. Balls. 10 @ 11c

2, 3, 4 and 5-Ply Jute. 1-lb. Balls. 13 @ 14c

Mason Line, Linen, 1/4-lb. Balls. 14 @ 15c

No. 28 1/2 Mattress, 1/4 and 1/2-lb. Balls, according to quality. 30 @ 60c

Wool, 3 to 6 ply. B 9c; A 10c

Vises—

Solid Box. 50 @ 50-10%

Parallel—

Athol Machine Co. 40%

Simpson's Adjustable. 40%

Standard. 40%

Amateur. 40%

Columbian Hdw. Co. 40%

Emmert Universal. 40%

Pattern Makers' No. 1. \$15.00; No. 2. \$12.50.

Machinist and Tool Makers' No. 1A. \$12.50; No. 6A. \$10.00; No. 10A. \$22.50.

Presto Quick Acting, Adjustable Jaw, 25 @ 25-10%; Solid Jaw. 35 @ 35-10%

Tiger Machinists'. 40%

Flasher & Norris Double Screw, net, each, Nos. 2, \$10.50; 3, \$16.00, 4, \$20.50; 5, \$27.00.

Fulton Mach. & Vise Co. 25%

Reed, Swivel. 25%

Star, Solid Jaw. 40%

Hollands: 40-40-10%

Machinists'. 40-40-10%

Keystone. 65 @ 70%

Lewis Tool Co. 30%

Monarch, 50%; Solid Jaw. 50%

Massey Vise Co. 40%

Climber. 40%

Perfect, 15%; Lightning Grip. 15%

Merrill's. 20%

Mills Falls Oval Slide Pattern. 60-10%

Parker's: 20-25%; Regulars. 20-25%

Victor. 40-45%

Vulcan's. 55-60%

Combination Pipe. 20-25%

Ireland's. 20-25%

Snediker & K. L. 33-34%

Stephens'. 33-34%

Saw Filers—

Diston's D 3 Clamp and Guide, 50 doz. \$24.00; 30%; Clamps. 30%

Perfection Saw Clamps, 50 doz. \$4.50

Reading. 60%

Ventworth's Rubber Jaw, Nos. 1, 2 and 3. 50%

Wood Workers—

Fulton Mach. & Vise Co. 25%

Reed. 25%

Star. 40%

Massey Vise Co. 40%

Lightning Grip, 15%; Perfect. 15%

Wyman & Gordon's Quick Action, 6 in. \$6.00; 9 in. \$7.00; 14 in. \$8.00.

Miscellaneous—

Holland's Combination Pipe. 60-60-5%

Massey's Quick Action Pipe. 40%

Parker's Combination Pipe: 87 Series, 60%; 187 Series, 60-65%; No. 870, 40%.

Wads—Price per M.

B. E., 11 up. 60c

B. E., 9 and 10. 70c

B. E., 8. 80c

B. E., 7. 80c

P. E., 11 up. \$1.00

P. E., 9 and 10. 1.25

P. E., 8. 1.50

P. E., 7. 1.50

Ely's B. E., 11 and larger. \$1.70 @ \$1.75

Ely's P. E., 12 to 20. \$3.00 @ \$3.25

Ware, Hollow—

Cast Iron, Hollow—

Store Hollow Ware:

Enameled. 45-10%

007

3/4
on

add
1/2¢

add

10%
10%

3¢

2¢

30.00
25.00

28.50

in.

80%
1/4%
1/4%
1/4%

65%
1/4%
1/4%
75%
1/4%

65%
1/4%
1/4%
75%

1/4%
1/4%
base
50%

10%
10%
x.
\$2.50

10%
25%
k.s.

15%
g.
10%
11.33

de:
\$3.40
\$3.65
\$3.90
\$4.40
port

10%
75%

10%
65%
10%
70%

Pipe,
mbi-

50%
10%
50%
40%
10%
10%
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10%
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70%
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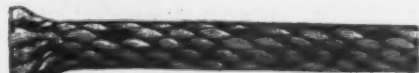
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65 Wall Street, New York

Bristol's Patent Steel Belt Lacing



THE BRISTOL CO., Waterbury, Conn.
New York: 114 Liberty Street
Chicago: 753 Monadnock Building

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Also Massachusetts and Phoenix
See page 230 Brands

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TURNBUCKLES



Branch Office, 11 Broadway, New York.
Cleveland City Forge and Iron Co., Cleveland, O.

TURNBUCKLES.



MERRILL BROS.,
405 to 471 Kent Ave.,
Brooklyn, E.D., N.Y.

COKE PILLING & CRANE
Girard Building, Philada.
Machesney Bldg., Pittsburg
Empire Bldg., New York

TIME IS MONEY

and by the use of

Apollo
Best Bloom
Galvanized Sheets

you save time in construction
and cost of repairs.

See
AMERICAN
SHEET & TIN PLATE
COMPANY'S
Ad. on Page 17.



POINTS THAT SELL THE *Remington* AUTOLOADING RIFLE

You can easily point out in a Remington Autoloading Rifle the features that appeal to a big game hunter. All of the good qualities of the old style big game rifle combined with wonderful rapid fire execution—5 knock-down blows in a second. Do you buy big game rifles to sell? Remingtons sell themselves.

Agency:
315 Broadway,
New York City

Remington Arms Co.
Hill, N. Y.

Sales Office: 1
515 Market Street,
San Francisco, Cal.

WATER TUBE BOILERS The Babcock & Wilcox Co. See page 70 85 Liberty Street New York

THE LARGE AND STEADILY IN- CREASING DEMAND FOR

"THE CAPEWELL" HORSESHOE NAIL

Is attracting wide attention among HARDWARE DEALERS who appreciate the fact that a large demand results in QUICK SALES; quick sales in more frequent DIVIDENDS, and a higher annual RATE of INTEREST upon every dollar invested.

Made by

The Capewell Horse Nail Co., Hartford Conn.



JENKINS BROS. VALVES

do not require constant regrinding. When necessary to repair, a new Disc will usually make the valve as good as new. Jenkins Discs are inexpensive, and can be readily applied by any one without taking valve from the pipe. All parts interchangeable. Write for booklet.

All genuine bear Trade Mark as shown in cut.

JENKINS BROS., New York, Boston, Philadelphia, Chicago.

"Swedoh" Cold Rolled Steel is unexcelled for Drawing and Stamping
THE AMERICAN TUBE & STAMPING COMPANY
Water and Rail Delivery) BRIDGEPORT, CONN. SEE PAGE 25



MAGNOLIA METAL

Best Anti-Friction Metal for all Machinery Bearing.

Fac-Simile of Bar.
Beware of
Imitations.

MAGNOLIA METAL CO.

Owners and Sole Manufacturers.
Chicago, Fischer Bldg.

113-115 Bank Street,
NEW YORK.

San Francisco, Montreal and Pittsburg.
We manufacture all grades of Babbit
Metals at competitive prices.

TIN PLATE AND SHEET STEEL

FOR
DEEP STAMPING
AND
DRAWING

FOLLANSBEE
BROTHERS
COMPANY
PITTSBURGH

BRASS

SHEET
ROD

COPPER

WIRE

SHEET

ROD

WIRE

GERMAN SILVER

SHEET

ROD

WIRE

LOW BRASS, SHEET BRONZE,
SEAMLESS BRASS AND COPPER
TUBING, BRAZED BRASS AND
BRONZE TUBING : : : : :

WATERBURY BRASS CO.,

WATERBURY, CONN.

99 John St., New York. Providence, R. I.

Bridgeport Deoxidized Bronze & Metal Co.

BRIDGEPORT, CONN.

Phosphor and Deoxidized
Bronze

Composition, Yellow Brass and Alumi-
num Castings, large and small

The Plume & Atwood Mfg. Co.

MANUFACTURERS OF

Sheet and Roll Brass AND WIRE

Printers' Brass, Jewelers' Metal,
German Silver and Gilding Metal,
Copper Rivets and Burrs. - - -

Pins, Brass Butt Hinges, Jack Chain, Kerosene
Burners, Lamps, Lamp Trimmings, &c.

279 Broadway, NEW YORK.

Room 508 Heyworth Building, East Madi-
son St., CHICAGO, ILL.

Rolling Mill Factories:
THOMASTON, CONN. WATERBURY, CONN.

SCOVILL MFG. CO.

MANUFACTURERS OF

BRASS.

GERMAN SILVER,

Sheets, Rolls, Wire Rods,

Bolts and Tubes,

Brass Shells, Cups, Hinges,

Buttons, Lamp Goods.

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1.

THE IRON AGE

New York, Thursday, June 6, 1907.

A New Garrison Universal Mill.

The three-high 25-in. universal mill of the National Department of the National Tube Company at McKees-

ing of the metal during the latter part of the operation of rolling, when the plate is long and thin, the time of rolling must be reduced to a minimum, and the mill must be heavy and rigid with rolls of the least practical

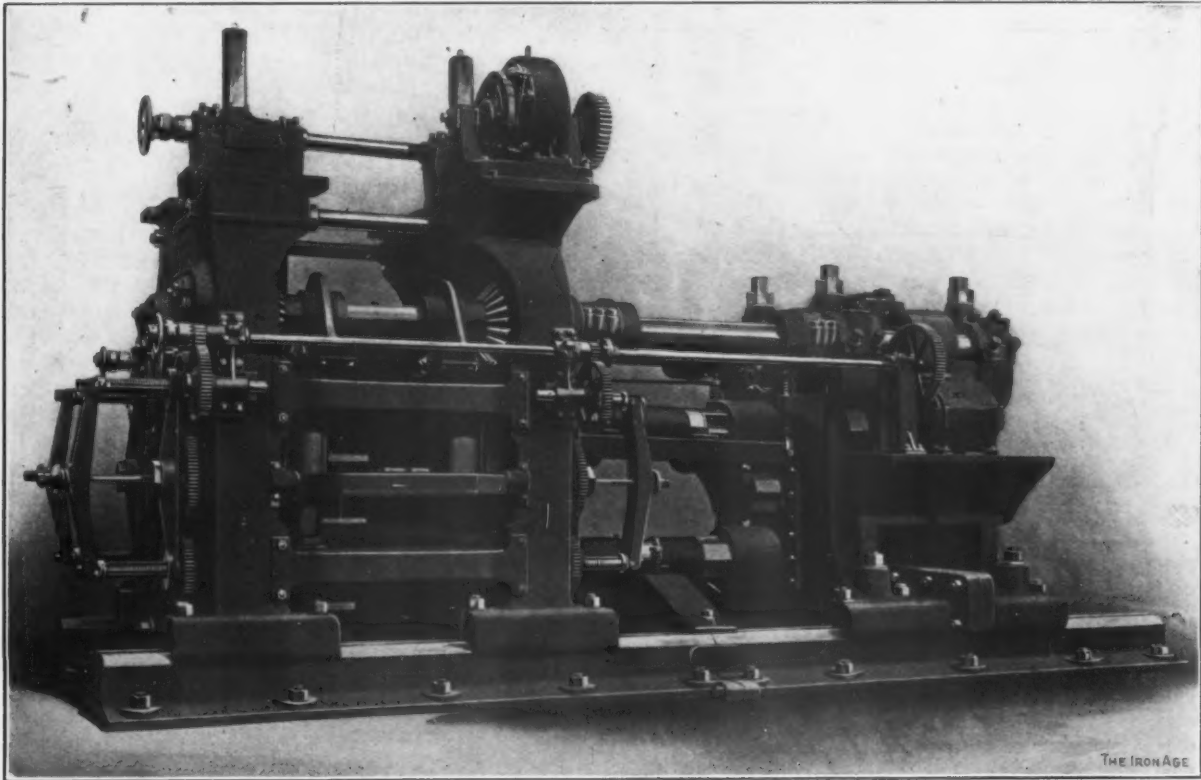


Fig. 1.—A Three-High 25-In. Universal Mill Installed for the National Tube Company by the A. Garrison Foundry Company, Pittsburgh, Pa.

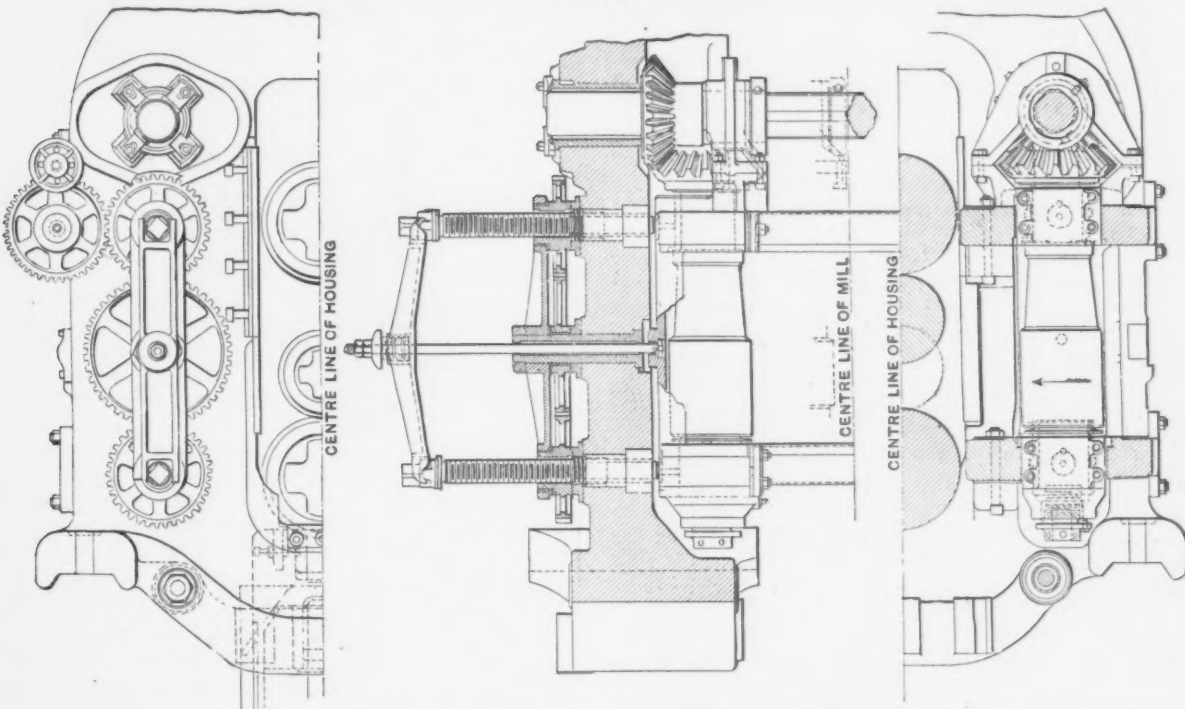


Fig. 2.—Details of One Housing, Showing a Part End View, a Lateral Section through the Center of the Vertical Rolls and a Part Sectional View Inside of the Housing.

port, Pa., was designed for rolling skelp in long lengths and light gauges and from 9 in. up to 42½ in. wide, and has been in successful operation for some months. For this work it is obvious that on account of the rapid cool-

diameter in order to easily maintain the gauge. The rolls also must be capable of accurate and ready adjustment, and one end of the top roll must be arranged so that it can be raised independently of the other, in order

that bowed or curved plates may be straightened in the succeeding passes. And particularly the driving engine must be capable of acceleration in speed as the piece extends in rolling from the slab until on the last passes it should run at the highest speed practicable.

This mill, which is illustrated in Fig. 1, was designed and built by the A. Garrison Foundry Company, Pittsburgh. It is driven by a 4000-hp. tandem compound Porter-Allen engine, capable of being speeded at will from 80 to 135 rev. per min., and plates 120 ft. long, 22½ in. wide and 0.127 in. thick have been rolled in 1¼ min. For the size of the mill—that is, for the diameter of the

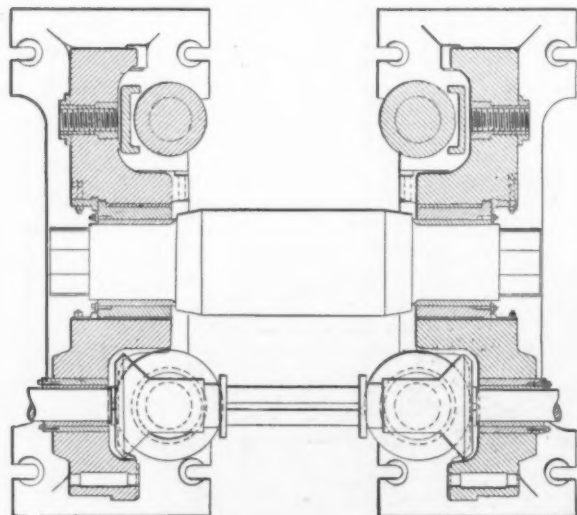


Fig. 3.—Plan Sections of the Housings, the Upper Part Being Taken through the Vertical Rolls and the Lower Part through the Center of the Driving Shaft.

top and bottom rolls—the weight is exceptionally great, being 530,000 lb. The rolls, however, while small in diameter, are unusually stiff, due to the fact that they are only 57 in. long, more than a foot shorter than the common length of rolls of universal mills of even less diameter.

The housings, sections of which are shown in Figs. 2 and 3, weigh 70,000 lb. each, and are, as will be seen, constructed to support this short roll on an extra long neck, while allowing the maximum spread of the vertical rolls. These vertical rolls are carried in a frame in the usual manner, but their necks rest in a vertical housing, which rides on the horizontal frames, and the bottom neck of the roll is supported in a step and is completely protected from scale. It is readily accessible and is arranged for vertical adjustment by means of the large capstan, headed nut.

The miter wheels are held in gear by a bonnet over the long hub on the wheel on the horizontal shaft, and the wear is taken up by means of a collar, which bears against a bronze liner and is threaded on the long hub of the horizontal shaft miter. This collar is secured by a key which registers with a number of keyseats in the On the arrangement of the vertical rolls a patent is pending.

An objection to the universal mill has been the difficulty of changing the vertical rolls, it being frequently necessary to remove the horizontal driving shaft to do this. In this mill this is obviated, as by removing the bonnet and backing off the miters, the vertical rolls with their housings can be taken out together, after the front bars of the horizontal frames have been removed.

The independent adjustment of one end of the top roll is accomplished by means of a wedge under the breaker operated by a hand wheel, and the pinions driving both the horizontal and vertical rolls are all inclosed together in an oiltight case, having, however, large doors on top, to allow for inspection.

An Omaha, Neb., dispatch says that the Burlington Road has advanced salaries of employees over the entire system, dating from May 1. Each department is given

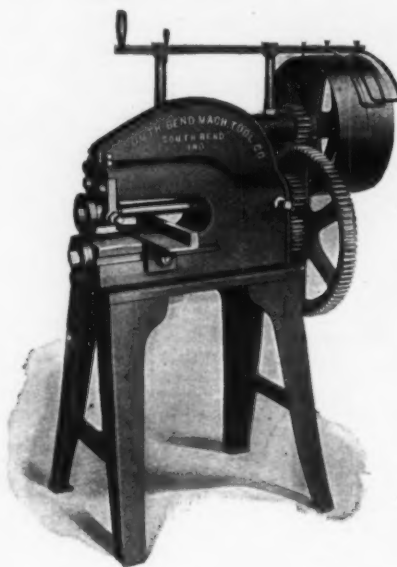
a 10 per cent. additional allowance, which is distributed by the head of the department. The advance does not apply to trainmen, whose pay is fixed by conference, or to telegraphers, the latter having recently received an advance.

The Cannon Ball Rotary Shear.

Combining the advantages of speed and accuracy with that of making straight, curved or circular cuts, rotary slitting or splitting shears are an important part in the equipment of modern sheet metal working shops. The earlier tools of this type that had any considerable throat capacity were generally limited in cutting power to sheets of thin gauge; those strong enough to cut No. 10 gauge and heavier are usually built with shallow throat depth, and are consequently unsuited for miscellaneous shop practice, which includes the splitting through centers of stock width sheets running up to 4 ft. wide.

The rotary slitting shear, shown in the accompanying illustration, called the "Cannon Ball," is a product of the South Bend Machine Tool Company, South Bend, Ind., and is designed to slit No. 12 gauge to a depth of 12 in. Two other sizes of this tool are made with 16-in. and 25-in. throat, respectively, the latter cutting up to and including No. 10 gauge. The machine is back geared and belt driven, the driving shaft being supported upon bearings which form a part of the shear frame. The driving shaft of the shear carries tight and loose pulleys and the belt shifter is within easy reach of the operator.

An adjustable gauge faced with hardened steel pins to prevent wear is provided and is held in position on the lower jaw of the shear by a bolt secured in a T-slot in the side of the shear body. The crucible steel wheel cutters are made reversible, and when one side is dulled the wheel may be reversed and the other edge used. A practically automatic feed is supplied by the rotary motion of the shear wheels and a cutting speed of 60 ft. per



The Cannon Ball Rotary Shear Built by the South Bend Machine Tool Company, South Bend, Ind.

second can be maintained. The shear body is mounted on heavy cast iron legs, the feet of which have bolt holes for anchoring the tool to the floor. The tool herewith illustrated weighs 700 lb. and is furnished with a hand crank if desired, since it may be operated either by hand or power.

Announcement is made that the Australian Government will guarantee debentures to the amount of \$6,250,000 in the projected mail shipping syndicate, the fleet to comprise 12 vessels of 11,000 tons, with a speed of 15½ knots, and will also give an annual subsidy of \$625,000.

A Large Mesta Engine Bed Plate Casting.

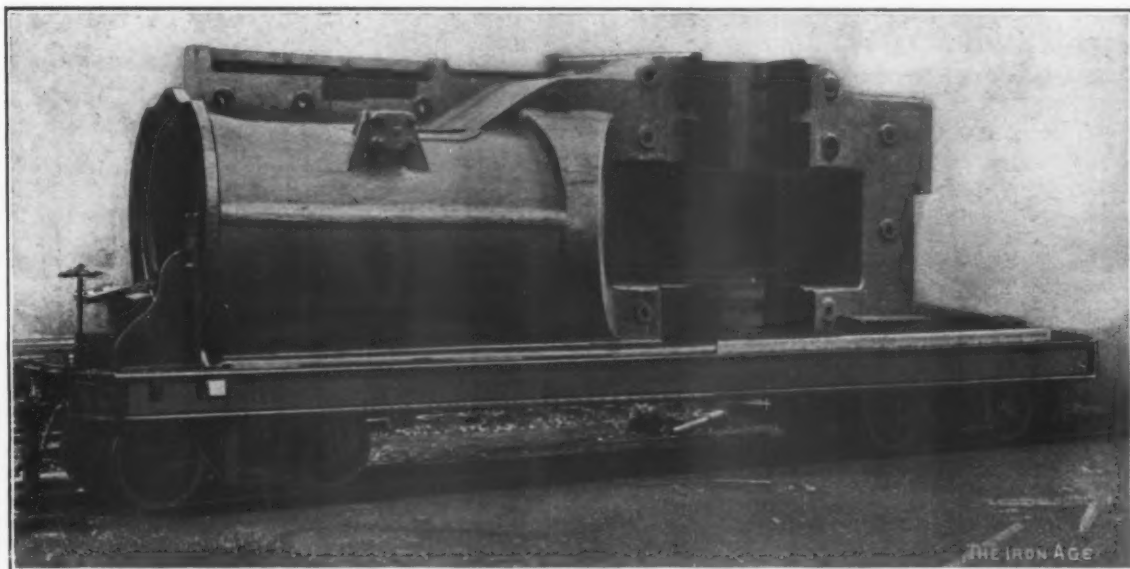
One of the largest castings ever made was successfully poured recently in the foundry of the Mesta Machine Company, Pittsburgh, Pa. The casting, which is shown in the accompanying illustration, forms the bed plate for the low pressure side of a cross compound condensing piston valve engine built by the Mesta Machine Company for the Bethlehem Steel Company, South Bethlehem, Pa. The engine is to be used for driving the finishing rolls of the latter company's new rail mill. To make the casting required 220,000 lb. of metal, and the bed plate weighed when finished 201,000 lb. It was made of air furnace iron and required the charge of six furnaces. The bed plate is 11 ft. 8 in. wide, 29 ft. 3 in. long and 9 ft. 9 in. high. It has two journal bearings, 29 in. in diameter and 46 in. long. As can be seen from the illustration, which shows the casting ready for shipment, the bed plate had to be set on its side and down in the pocket of the car, its extreme width not permitting it to be carried otherwise.

The engine for which the casting was made has a high pressure cylinder 44 in. in diameter, while the low pressure cylinder is 76 in. in diameter, both having a 60-in. stroke. The flywheel of the engine is one of the

and all feeder circuits were connected directly on the machine without switches, or fuses, by means of jumpers without a single mishap to cause a shutdown. Last fall one of the screws worked out of one of the split oil rings on the pulley end. Not being able to shut down, we ran along with the remaining one till March 28, 1907, when the machine was shut down for three days. It was then thoroughly cleaned out, new oil put in the bearings, collector rings turned true, the broken oil ring fixed, and service commenced as usual. The alternator is belt driven, and an engine is located at either side with belt attached in case of emergency. Bearing in mind that this machine carries a continuous overload of 25 to 60 per cent., its record is truly wonderful."

The Duty on Rhodium.

The Board of United States General Appraisers has decided that rhodium, a rare metal found in platinum ore, is properly dutiable at 10 per cent. under the provision in the tariff act for "unenumerated unmanufactured articles." The Wells-Fargo Company, the importer, was assessed at 25 per cent. under the provision in the law for "chemical salts." General Appraiser Fischer, who writes the decision of the board, has no



A Large Mesta Engine Bed Plate Casting Made by the Mesta Machine Company, Pittsburgh.

largest ever built, it being 22 ft. in diameter and weighing 200,000 lb. finished. The engine is one of three built by the Mesta Machine Company for the Bethlehem Steel Company. In addition to the engines, the Mesta Machine Company has an order from the same company for a large blooming mill, together with all the tables, shears, &c.

An Electrical Generator's Nonstop Run.

Electrical generators have become such a standard product that attention is seldom called to that thoroughness of design and construction which results in such a record of reliability as that shown in the following statement concerning a 150 kw. three phase, belt driven alternator built by the General Electric Company. This generator ran more than four years, 24 hr. a day, with a single stop of 15 min. due to a defective pulley. The details of this performance are given by Assistant Manager Rhodes, of the United States Smelting Company, West Jordan, Utah, as follows:

"The generator was received about June 1, 1902. It was put in service October 15, for 11 hr. per day until November 9, when 24 hr. per day service was required. On January 25, 1904, shortly after noon, the paper pulley on the exciter went to pieces. A cast iron pulley being on hand, a shutdown of 15 min. was recorded. From June 13 to 18, 1904, the switchboard was moved,

difficulty in finding that the product is not a chemical salt. He says:

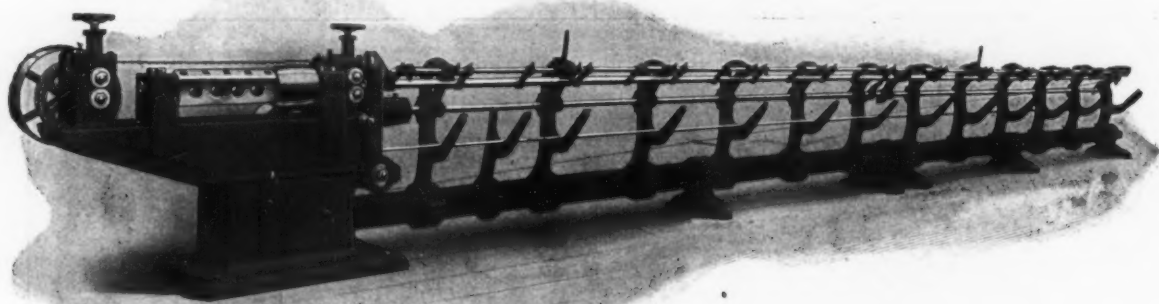
"The testimony shows that rhodium in association with platinum, palladium, iridium and other metals of the platinum group, is found in platinum ore. To obtain it from the ore it must be isolated or extracted from the other metals with which it is found in chemical combination. We find that rhodium is incapable of being wrought and that the only theory which would permit its classification as platinum, palladium or iridium would be by similitude, and this is prohibited so far as articles provided for in the free list are concerned. Rhodium is not a chemical salt, as assessed. It is not a platinum or other metal of the platinum group, for which provision is made in the free list, nor can it be classified under any of the provisions for such metals. It is not a crude metallic mineral substance, nor can it be regarded as a metal unwrought, in view of the ruling in *Hempstead vs. Thomas*. We find that it is an article unenumerated and unmanufactured and sustain the claim in the protest that it is dutiable at 10 per cent., under the provisions of section 6 of the tariff, and modify the decision of the collector accordingly."

The Pittsburgh Automatic Vise & Tool Company, Pittsburgh, has appointed the Southwestern Engineering & Supply Company, St. Louis, as its agent in that district.

An Extra Long Shuster Wire Straightener and Cutter.

The automatic wire straightening and cutting off machine, shown in the illustration, is unusual on account of its great length, being capable of cutting $\frac{1}{2}$ -in. wire into lengths up to 32 ft. It is made in two sections, the second section being detachable, so that when the machine is used for cutting short lengths, all unnecessary wear and tear is avoided. Its purpose is to meet one of the many requirements of the wire goods trade, in this instance especially the automatic straightening and cutting of long lengths of brass wire of $\frac{1}{2}$ -in. and smaller, directly from the bundle. It is one of the many adaptations of the line of wire machinery built by the F. B. Shuster Company, New Haven, Conn.

In this machine, a shaft about as long as the greatest length of wire it is intended to cut, is attached to the fulcrum of the cutting off lever and rotates with each movement of the lever. The guide bar, situated above and forward of the shaft, is connected with both the shaft and the cutting off lever and has a groove running its entire length and containing an adjustable gauge,



A 32-Ft. Automatic Wire Straightening and Cutting-Off Machine Built by the F. B. Shuster Company, New Haven, Conn.

which is connected at its outer end by a wire to a clutch on the cam shaft. When the straightened wire strikes the gauge, as it passes through the groove from the bushing die, it throws in the clutch, causing the cutting off lever to work instantly, and at the same time the rotary motion of the shaft throws the cover off the groove in the guide bar, by means of arms attached to it, and the cut wire drops out. If straightened wire is run out too far without support the end will drop out of line more or less, according to the size of the wire, and if fed out by power against a stop gauge, it will either bend or spring before it can be cut off, and cannot, therefore, be cut into accurate lengths. The grooved guide bar, with cover and gauge, overcomes these difficulties.

The so-called back feeding device employed in the machine consists of a pair of rolls on the end. They assist in feeding the stock which first passes through them and then into the rotary straightener, serving to increase production and decrease wear. The machine illustrated is 37 ft. 7 in. long, 4 ft. 7 in. wide and weighs 6400 lb. Larger sizes also are built having capacities respectively of $\frac{5}{8}$ -in. and $\frac{3}{4}$ -in. stock.

Electrolytic Action Overcome by a Counter Force.—

Trouble having been experienced in condenser tubes of a zinc-copper alloy, due to impurities in the water and to electrolytic action from leaks from a nearby trolley system, resulting in rapid corrosion, the condensers were insulated from stray currents by the use of insulated joints for all pipe connections, and also by lengths of glass lined pipe. A counter electromotive force of 0.6 volt was then provided to overcome the positive electromotive force of 0.42 volt, set up when the alloy of the condensing tubes was placed in the cooling water, this counter current being provided by a 3-kw. generating set, provided with wiring and switchboards as for electroplating work. The apparatus worked satisfactorily for 14 months, during which time only 10 tubes, or less than one per month, were destroyed by the electrolytic action.

Export Freight Rates Not to Be Withdrawn.

WASHINGTON, D. C., June 4, 1907.—The Interstate Commerce Commission is being besieged with inquiries, based upon misleading reports published in the daily press, to the effect that the export business of the United States in iron and steel products "is threatened with grave disaster because of the determination of the railroads, just announced, to discontinue giving specially favorable rates to the seaboard on goods intended for export." It has been further specifically stated that on the 1st inst. domestic and export rates to the seaboard on iron and steel products were placed on an absolute parity. In the various communications received by the commission it has been asked whether the railroads propose to "crush out the export trade" in iron and steel, and suggestions are solicited as to the proper method of bringing before the commission formal complaints of shippers whose business is threatened with disaster by the alleged action of the carriers.

Erroneous Report.

The correspondent of *The Iron Age* is authorized to state that the action of the railroads has been entirely

misrepresented in the publications referred to. The export business in iron and steel is in no way threatened by the changes in rates that have been decided upon, and the actual advances amount to only a small fraction of the differential which for several years has prevailed in favor of shipments intended for foreign consumption. In accordance with tariffs filed with the Interstate Commerce Commission, effective January 1, 1903, rates were established on iron and steel products intended for export which were about one-third lower than the rates between the same points on domestic shipments. These schedules of rates were put in force for a period of six months, but the differential has been extended semiannually and in the ordinary course would expire on July 1 next, unless further extended. Under the new interstate commerce law 30 days' notice of changes must be given in all cases, except in certain emergencies, and as this rule applies to the iron and steel export differential the leading railroads during the past week have filed new tariffs disclosing their policy with respect to the treatment of these shipments. In the opinion of the experts who have received these schedules the export differential has been reduced from 2 to 3 per cent.—that is to say, the concession in favor of export business will be 2 or 3 per cent. less after July 1 than it has been since January 1, 1903. This curtailment of the differential, however, is less than 10 per cent., and does not apply equally throughout the iron and steel tariff, but is so adjusted that the change will be smaller on the principal articles exported than on others. So far as iron and steel rails are concerned, the rate now in force has been extended to December 31, 1907. The commission's experts do not believe that the changes which take effect at the beginning of the new fiscal year will injuriously influence the export business in iron and steel products, which has grown to very large proportions, nor do they regard the action of the roads in slightly reducing the export differential as foreshadowing any plan to place export and domestic business on a parity.

W. L. C.

The Quick Sharpening Edge Tool Grinder.

The functions of an ordinary grindstone and an oilstone are combined in the machine illustrated, which is known as the Quick Sharpening edge tool grinder, and is claimed to be quicker and more satisfactory for sharpening edge tools. The machine and its equipment are manufactured by the Mummert, Wolf & Dixon Company, Hanover, Pa., for which Barwood & Snider, Philadelphia, Pa., are agents.

The spindle of the machine carries oilstone wheels on each end and is driven at the center by spiral gears from a tight and loose pulley shaft, which extends to the rear. The pulleys being on the back of the grinder keep the driving belt where it offers no interference with the work of grinding. At normal speed the tight and loose pulleys run at 340 rev. per min. A deep pan mounted on top of a pedestal contains the wheels and is provided with covers to enclose them when not in use. Fig. 1 shows the



Fig. 1.—The Quick Sharpening Edge Tool Grinder Made by the Mummert, Wolf & Dixon Company, Hanover, Pa.

machine open, ready for service, and Fig. 2 with the covers closed.

The grinding wheels can be run in either direction, but it is preferable to have them run toward the front. One of the wheels has a very sharp and comparatively coarse grain, and is adapted for fast grinding; the other wheel has a very fine and also sharp grain, which gives the tool a very smooth edge. It is not necessary after grinding the tool on the fine wheel to do any whetting on an oilstone. The wheels run in a bath of oil, usually ordinary kerosene, which prevents the tool from heating and also keeps the surface of the stone clean and sharp and prevents glazing. By closing the lids or covers when the machine is not in use dust and dirt are excluded from the oil and the surface of the wheel. When the lids are open they act as oil trays to catch any oil which may run out along the tool and drop off. On being closed the lids return the oil into the receptacle in the casing. Another way to use the wheels, which allows them to run at double speed, does away with the bath, the wheels being soaked with oil. Centrifugal force brings the oil to the surface when the wheels are running and the occasional adding of a few drops of oil is sufficient.

Two oilstone wheels, 8 in. in diameter by 2 in. thick, and two round face grinding wheels, $3\frac{1}{2}$ in. in diameter, 3-16 and $\frac{1}{2}$ in. thick, respectively, are regularly fur-

nished with the grinder. For grinding gouges and molding bits a round face emery wheel is provided at the back. There is also a separate attachment, which is furnished extra, for sharpening long bladed knives.

Metal Trades Labor Bureau Service.

The Rhode Island Metal Trades Association, comprising many prominent manufacturing establishments of Providence and vicinity, has decided to establish a labor bureau. The association has issued the following statement, which is intended to correct false reports which have been circulated regarding the objects and purposes of labor bureaus as at present maintained in many cities and towns of the United States by branches of the National Metal Trades Association.

"The labor bureau is essentially a medium where members of the association can secure competent help and where workmen out of employment can, without



Fig. 2.—The Grinder with Covers Closed When Not in Use.

expense to themselves, secure positions. It is not, as has been stated by the labor agitators, a record office for blacklisting members of the labor unions, since as the Metal Trades Association is pledged to the open shop such action would be contrary to their fundamental principles; and as a matter of fact the question as to whether a man is a member of any labor union is never asked of an applicant for work—it is immaterial, provided he is a good workman and attends to his duties.

"The assistance rendered the working man by these bureaus is far reaching, as is shown by the fact that in Worcester over 10,000 applicants have been provided with positions in a period of four years; in Cincinnati in one year over 5400 skilled workmen were provided with positions. In Chicago the growth of the work has been very rapid, as is shown by the following records: The first years after starting the bureau there were 4100 applicants, of which number 2960 were provided with positions; the second year there were 7446 applicants and 6084 positions secured; the third year there were 10,629 applicants and positions provided for 8689. These figures show the value of the labor bureau service and the good that it can do for both employer and employee."

The circulation of national bank notes has passed \$600,000,000 and stands at the highest point in the history of the national banking system.

Foundry Design and Construction.*

BY GEO. K. HOOPEE, NEW YORK.

The foundry business has become so specialized and such rapid strides have been made in the elementary knowledge of the methods and requirements of manufacture that it is difficult to make any general remarks on the subject of foundry construction. I will, however, endeavor to describe some of the plants which I have designed and which comprise foundries devoted to the casting of the smallest forms as well as large sections with practically no core work, to the most specialized shops using machines almost exclusively.

A Heavy Work Foundry.

For plants engaged in heavy work I have made designs in two ways. In one instance, owing to the form of the site and the location of the railroad tracks, it was found advisable to place the stock house and melting equipment at one end of the foundry, permitting all of the other operations to divide from that point as a basis. For this shop a straight open building, three bays in width, was designed, the second bay having been provided with cranes of sufficient capacity to handle the largest ladles, as in this case the work was such that the ladle of iron was the heaviest thing to be handled. Single rail electric travelers were also installed in the main and side bays, provided with suitable wedges to facilitate their movement from one department to another. In addition to serving the foundry these trolleys were used for cleaning up and for conveying scrap, sprues, gates, &c., from the foundry to the stock house.

The melting equipment was in the middle of one end of the foundry and was separated from it by a brick wall. The spouts of the cupolas projected through the latter and were adjustable, so that large or small ladles could be filled at any distance from the furnace. The brick wall also kept the slag fumes out of the foundry, and the drop was likewise confined, which made the work of cleaning up comparatively easy. The cored and small work was done close to the cupolas, while the large work, on which the temperature of the iron could vary considerably without affecting the castings, was placed where most convenient. It is unnecessary to state that such work is required the use of cranes was done in the middle bay.

CLEANING DEPARTMENT.

The cleaning department was located at the end of the building opposite the cupolas, partly in the center and partly in the side bays, the design being such that as the foundry increased its output the building could be increased in length and the cleaning equipment moved along to provide additional molding space. With the growth of the plant in view mills, grinders and the sand blast machine were placed as far down as possible, that they need not be moved until the second extension to the foundry was made. The contour of the site was such that the waste material could be moved out of the side and end of the shop for filling purposes.

Owing to the peculiar location of the railroad tracks, the stock house was placed across one end of the building and the track was extended up to the charging floor, making it possible to unload several carloads of coke and iron onto this floor. The space underneath the trolley was utilized for the storage of iron, coke, sand, fluxing material, &c., and the whole was inclosed by a like building which contained a single rail electric traveler for handling material to the cupolas and the foundry, and which connected with the trolleys in the latter.

THE MAIN BUILDING.

The main building was of steel frame construction, with brick curtain walls, and was provided with a wooden roof covered with slag roofing and with large wooden frame sliding sash windows. The floor of the foundry consisted of molding sand laid on filling, although no pit work was done. Ventilators with tilting sash operated from the floor extended practically the width of the

center bay, and while there were no skylights, sidelights were depended upon for all of the illumination, the windows having been carried as high as possible for this purpose. Large galvanized iron ventilators were placed in the roof at every other bay, to provide for the circulation of air when not pouring and in inclement weather.

The foundry was about 350 ft. long, and if it were increased in size to make other melting equipment necessary the cupolas would be installed at one side sufficiently far down conveniently to distribute the iron according to the varying classes of work to be poured. It is not probable, however, that this will be done, as there seems to be no reasonable limit to the distance which a ladle of iron for heavy work can be carried.

A Foundry for Machinery Castings.

A foundry of another type for the production of medium and large machinery castings, with a fair proportion of cored work, was laid out partly in accordance with the contour of the site on which it was located, due regard being given to the location of the railroad tracks. This foundry was of the usual three bay type, having one large center bay and two smaller ones on either side. The stock house was placed at one side of the property adjacent to the railroad track and contained all of the raw materials except the iron, which was carried in the yard commanded by a crane. The stock house has an elevated track extending through it, that all supplies could be dumped by gravity from the cars in which they were received and thereafter conveyed under cover into the foundry. This stock house need not darken the side of the foundry which it adjoins, since it can be located far enough away to permit the placing of windows down to a level about 7 ft. above the floor, with a light well at least 12 ft. wide. In any event it makes little difference whether the light is somewhat obstructed on that side, since the melting equipment occupies some of it, and with a foundry for this class of work there are core ovens, drying ovens, sand mixers, core storage, core-making and other departments which do not require much light, while others can be suitably lighted by skylights.

CONVEYING APPLIANCES.

The coke is raised to the charging floors on cars by means of a plunger elevator, while the iron from the stock yard is carried by a single rail traveler directly to the charging floor.

Both the melting and cleaning departments are fixed points in this scheme, the foundry with its stock house and yard growing away from these departments, and additional melting equipment can be placed in the side bay if required.

Cleaned castings are stored in a yard or building at right angles to the foundry, communicating with the machine shops. As there is considerable core work a large amount of refuse has to be elevated by cheaply built conveyors to a set of overhead bins, discharging into cars or wagons.

Since a foundry of this type will have some pit work the flooring will naturally consist of sand to a considerable depth, with brick or concrete floors in the cleaning department. The cleaning floor space will absorb some of the molding room as the foundry is extended, but otherwise this department will not be disturbed.

This type of plant presupposes a large establishment divided into departments, castings being made at the option of the foundry rather than in response to some demand from the machine shop. This plant is to be built with masonry walls, having a wooden roof covered with slag or gravel, wooden window sash, partly sliding and partly tilting, large monitor with tilting sash, galvanized ventilators, corerom partitions fireproof, and with floors in front of the drying ovens and the corerom of concrete construction.

A Foundry for Chilled Castings.

Another type covering several classes of large work is designed to grow in two directions, being devoted to a large amount of chilled work. The melting equipment, including air furnaces, is located in the center of the building, and the space immediately in front is occupied

* Paper read at the annual convention of the American Foundrymen's Association, Philadelphia, Pa., May 21-23, 1907.

by the ladle and chill storage and ladle mending departments. Inasmuch as the molds for the sections made in this plant are cast on end a proportionately greater tonnage can be secured from a limited floor space, as compared with a plant where floor molding is done exclusively. Considerable room is required in a shop of this kind for handling ladles. Separate power cranes are also required for each pit, and liberal head room is necessary. The floor about the pits in front of the drying ovens should be made of concrete. The growth of the other end of the plant devoted to the production of general castings will be similar to that of the large foundry already described.

ARRANGEMENT OF THE PLANT.

A plant of this kind may be divided into three or more bays, the furnaces being so located that they are accessible to the main bay cranes. The stockhouse and iron storage may be located as previously explained. The charging floor, on account of the cupolas necessary to supply all of the mixtures required, should be served by an overhead crane, which can carry large pieces of scrap and carloads of pig iron to any cupola or furnace.

While the area required per molder in lighter gray ironwork may be as great as in heavier work, or even greater, the tonnage handled is proportionately much smaller. Frequently no overhead equipment is required, tracks or trucks being amply sufficient for handling the iron. Certain floors may require comparatively large amounts of iron and separate handling appliances, but in general the buildings will be divided into bays, with the melting done at one end or one side, and the cleaning department directly opposite. The pickling department should be located away from the natural line of growth, so that extensions will not disturb this department. For this class of work the corerom can be established at a distance from the foundry, and it is not essential to have it directly in or adjacent to the foundry building.

The stock sheds and iron storage should, of course, be convenient to the melting department, and the overhead crane is not essential to the iron yard. Tracks and cars connecting with the elevator are as economical as a yard crane, when all of the handling is considered. A separate building should also be provided for the storage and repair of molding machines.

In a foundry of this type it will be found necessary to install light overhead travelers, which can serve either the molders or the machines, and which in any event can handle the iron. Considerable space is also necessary in a plant of this kind for stacking flasks, as it is not practical to have a large flask yard or to build a separate structure for them. Galleries can be used very well as storage room.

Plants Equipped for Special Work.

Foundries equipped with machines for special work will next be considered. They can be built several stories in height, with a foundry on the upper floor and the other departments underneath, or where there are a number of foundries in a group the buildings should be two stories, with the foundry on the top floor. The various foundry buildings should be located so as to conveniently receive their supplies from one stock house and their cores from another, with a pattern storage and repair department over one or the other of these buildings. The buildings should be designed with sufficient head room in the lower story to accommodate large tumbling mills, with a platform over them for suitably distributing stock, the mills being high enough to dump their contents either into barrels or onto conveyors. A floor should also be provided for the foundry, with a frame for a suitable grating, through which the sand can be dropped and on which castings can be piled after shaking out.

The roof should have sufficient strength to support travelers for carrying the molds and iron, and all bracing should be kept above the trusses, as far as possible, to provide for conveyors for handling sand to the molding machine hoppers. The trusses should be designed with a stiff lower chord, and should be of such form that the apparatus may be fastened to it anywhere without punching or drilling. A durable floor can be made of paving brick laid on planks, with a cushion of sand, the planks

having previously been covered with a waterproof material to prevent dry rot. A floor of this kind can be changed for any purpose more easily than one of steel or concrete, and is furthermore much lower in first cost.

The castings are dropped through chutes in the floor to the mills below, where the sorting, cleaning and grinding are done, although a certain amount of sorting can be done on the foundry floor by judiciously locating the machines on similar work.

Specialty Foundries.

Plants for highly specialized work, involving carriers for handling molds, flasks, castings, &c., will next be considered. There are two types, one with the building two or more stories in height, with a carrier on the upper floor, while the other has the carrier and the other departments on the ground floor. The price of the real estate and the size of the cores largely govern the design of a plant of this kind, as the output is large in volume and must be handled by conveyors, and there is little advantage in the use of gravity.

I have built plants of both types and have found either well suited for the work for which it was planned. In one case the corerom and core storage were located so that the cores for all classes of work could be placed on the carrier with a minimum amount of handling, and each car of the carrier brought a fresh core to replace the one taken away. All departments, including the cleaning room, were on the ground level. Such a plant requires a large amount of light and ventilation, and windows and skylights are placed wherever possible. The floors are preferably of concrete, as practically no sand collects upon them, and as the pouring is done while the flasks are in motion on the carrier there is little danger of spilling or splashing iron. In another plant producing very small castings the carrier was placed on the second floor, and the finished sections were delivered by means of a conveyor through a separator and cooling tank to a continuous cleaning apparatus on the first floor. The cores were handled in trays.

The roof of such a foundry should be very heavy and substantially braced in all directions, as it must support considerable overhead conveying apparatus for the handling of sand, with concentrated loads at various points where the sand happens to be located. The floor should be of brick or concrete, preferably the former, for reasons which I have already given. There are no great floor loads with carriers, but a complicated flooring system is usually necessary on account of many conveying devices which are used.

Wall Construction.

In the construction of buildings brick walls, either with or without steel columns for supporting the trusses, have been used. There are other forms of wall construction from which choice can be made, such as reinforced concrete, concrete plaster on wire lathe, concrete blocks, terra cotta hollow blocks with or without steel reinforcing strips, brick, corrugated iron and wood. The last two are rarely used at present, wood being objectionable on account of the fire risk, and corrugated iron in view of its short life. Of the other materials the question of relative cost is a large factor, and a suitable selection must be made to fit the case in hand.

OBJECTIONS TO CONCRETE.

I have always presented plans of all my buildings to the reinforced concrete contractors, that they might compete with the other forms of construction, but I have not yet been able to secure a bid or to have a building built as cheaply by them as from other materials, and when I say this I accord due appreciation to the question of insurance, as locality and contents are considered by the underwriters, as well as the type of the building.

I am somewhat opposed to reinforced concrete on account of its lack of what I term "manufacturing elasticity," since it does not adapt itself very well to alterations and extensions which are constantly being made in plants devoted to foundry work. Brick, concrete blocks and hollow tile are the most adaptable, brick probably being more so than any of the others. Considering the present price of brick, no saving can be effected by the

use of the other two forms of covering, although in the large foundries to which I refer the weight of the steel can be maintained at the minimum by the use of hollow tile above the windows.

For interior partitions hollow tile makes a firm, cheap wall. Concrete plaster on wire lathe, expanded metal, or galvanized netting usually requires so much supporting steel that it is quite expensive and practically costs more than brick and does not possess the advantages of the latter.

Roofs.

Steel roof trusses should be carefully designed so that they may be conveniently reached with cleaning and paint brushes, especially in foundries of the continuous type, where considerable vapor arises from the cooling sand. The trusses and columns should be carefully and thoroughly painted. Roofs are cheaply constructed of wood, with slag or gravel covering. This covering is favored in view of its low first cost, as against slate, tile and special forms of reinforced concrete. I have had only one disastrous experience with a roof of this kind, and that was due to the fact that the sprinkler system had not yet been connected.

Windows, Skylights and Floors.

Windows, except where there is an exposure, are generally made with wooden frames, glazed with factory ribbed glass, and should be fitted to tilt, thereby securing the greatest possible opening. There was at one time a craze for making walls almost entirely of glass and steel. These buildings, however, are difficult to heat in winter and to ventilate in summer, while the glare of the direct sunlight is most unpleasant. Many plants of this kind have adjusted curtains to the windows and have glazed portions of the windows and in some cases large sections have been removed.

A building wall containing 50 per cent. of window space will usually be very completely lighted for any width of structure and in any event passages and storage departments can be placed in the darker sections.

I am an advocate of metallic bars and ribbed glass for skylights, and in continuous foundries where a large amount of vapor is present a copper bar is cheapest in the end.

All of the floors I have described have been used successfully, but there is one type that I have not referred to and which is built of ordinary brick, with rails laid thereon, over which the flasks of the machines can be moved as the case may require. The rails should be laid down on sleepers in a sub-base of concrete, if this floor is on the ground level. The floors of the charging departments should be made of steel plates without tracks, or, in fact, any ridges of any kind to interfere with the free movement of trucks and the use of shovels or forks.

Cupolas.

The cupolas should be set fairly high so that a man may work conveniently under them and to facilitate also the handling of ladles of various sizes. This is especially a desirable feature for continuous foundries where a ladle reservoir is provided with a skimming device which is located between the cupola and the pouring ladle.

The charging door I usually make very large, with a heavy cast iron curb, that a truck of scrap or coke may be run right up to it and dumped in. The opening is best protected by a wire screen raised and lowered by counterweights. The installation of spark deflectors depends somewhat on the location.

I sincerely hope that some one will soon devise a practical cupola blast regulator. I have some ideas on the subject myself, but have been too busy to develop them.

Depending on the work, I advise from 11 to 14 ft. above the tuyeres as the proper height of the opening in the cupola for economical and rapid melting. After considerable experience with tuyeres of various types, I still adhere to the old-fashioned square box tuyere as being the most reliable and efficient. Blowers vary in accordance with the service they are to render, my preference being for a positive blast blower for cupola work, with independent engine or motor, as circumstances may dictate. The motor should be provided with a speed regu-

lator to control the melting, the latter being imperative for continuous practice. For air furnaces the centrifugal blower seems to be best adapted, a simple unloading device being sufficient for its regulation. It is, of course, needless to say that the larger the fan within reasonable limits, the smaller the consumption of power.

I also advocate the slagging of the iron as the melting proceeds, and the tonnage of the heats will naturally indicate whether or not a special conveying apparatus should be used for handling this slag. A wheelbarrow is, of course, the simplest device.

Raw Materials.

The coke should be kept under cover, and handled as little as possible. Scrap should be handled according to its nature, as no single method will answer for all grades, although the magnet seems to be more adaptable than any other method. A system of handling pig iron will depend upon the amount consumed. Small quantities for small cupolas which must be broken can be handled more cheaply by common labor, while large tonnages offer a prolific field for the use of a magnet and adds considerably to the storage space. I have yet to be convinced of the value of a cupola charging machine. Storage yards for charging materials should be served by an overhead crane and industrial tracks should be used as little as possible.

Plunger elevators are best adapted for charging floor service. Whether the machine should operate directly by hydraulic pressure or with some elastic medium interposed between the water and the source of power will depend largely upon conditions. In large foundries, and especially for continuous work, I usually provide a speaking tube between the melter and the charging floor that the chargers may supply coke in accordance with the demand for iron from the floor. From this you can see that the melting ratio is of comparatively little importance in this work, when compared with the cost of a completed mold. Frequently the core alone costs several times more than the coke employed in melting the iron.

Cranes and Conveyors.

For handling large flasks I prefer a locomotive crane, as it gives the greatest flexibility with the least expense. The practice of running an overhead crane through an opening in the end of the building is very expensive and unsatisfactory, requiring as it does expensive building construction. It is furthermore impossible to keep tight against the weather while the flask yard is limited to the space directly in line with the crane runway and generally in line with and obstructing the growth of the foundry. By the use of the locomotive crane a site of any shape can be utilized and the crane can enter the foundry at almost any point. As it is operated by steam, it can be driven independently of the plant. For indoor flask storage, trucks and elevators provide suitable and convenient means for handling.

Belts of a liberal size with bucket elevators are best adapted for handling sand when it is to be delivered to the various parts of the foundry mechanically. Belts may safely be used for receiving hot sand dumped out of flasks, though containing many sprues, much shot and chaplets. Belts also may be used for handling flasks in continuous work even though they are hot and of considerable weight. I also advocate sand riddles with bronze wire, as it lasts longer than iron, steel or brass. Wood or reinforced concrete is the best material for sand hoppers, conveyor troughs, etc., while all the advantages are in favor of wood.

In designing continuous systems, whether wholly or partly automatic, care should be taken to keep the various operations independent of each other, that any interruption to any one may not affect the others. The efficiency of this method of producing castings depends largely on the care given to this feature. I have known of some who have failed entirely as a result of the too close adjustment of the various operations, whereas a little room between them would have made the plant a success.

When cranes and tracks are used, care should be taken to prevent points of congestion at meeting or transfer places.

Core Rooms.

Core rooms naturally depend on the nature of the work. For large and intricate work they should be located in the foundry, while others can be placed in separate buildings and can deliver the cores to the foundry on conveyors and can later be distributed by boys. For making cores of moderate size to be handled in dryers, I advocate that the benches should be so spaced that the oven cars can operate between them, permitting the finished cores to be placed directly on the cars and when filled they can be run directly to the ovens over suitable tracks. After the cores are baked the cars can be delivered to the core storage room, thus obviating unnecessary handling.

For cores of large or moderate size I prefer an oven which has a long arch at the bottom with fire and combustion chambers underneath, and the heat thus radiated will circulate through every part of the chamber. For small cores I had devised an oven heated by oil or gas containing a conveyor. Learning later that the same could not be patented owing to a previous right on a continuous baking machine, I lost interest in the same. A plant which I built has eight of these in operation, using oil in conjunction with waste heat from the malleable annealing ovens.

A New Lidgerwood Mast Hoist.

An electric mast hoist developed by the Lidgerwood Mfg. Company, New York, to meet some exacting modern engineering conditions is herewith illustrated. It is specially compact, containing as it does the electrical motor, controller and resistances, the two drums for operating

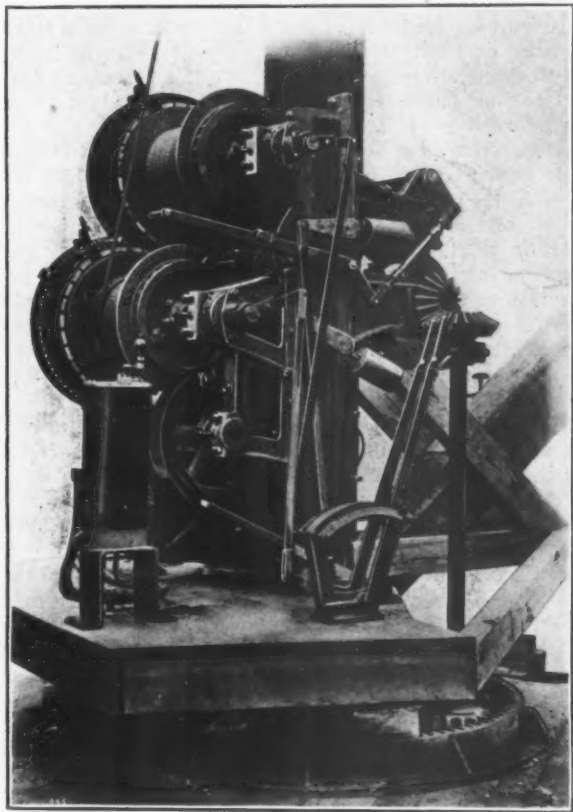


Fig. 1.—Hoisting Engine of the Lidgerwood Mast Hoist, Built by the Lidgerwood Mfg. Company, New York.

the boom and fall lines of the derrick, all within reach of the operator. Fig. 1 is a view of the hoisting engine, while Fig. 2 shows it as installed for operating. This derrick was designed especially for preparing the foundations of the new terminal building in course of construction for the Hudson Companies at Cortlandt, Church, Dey and Fulton streets, New York. In preparing the foundations for several of the huge structures recently erected in New York it has been found that where a

number of caissons were to be sunk closely together it was necessary for rapid and economical working to equip travelers with derricks and to keep the dimensions as small as possible in order to allow for the use of a number of similar derricks within a limited space. The new Lidgerwood derrick goes far toward solving the problem and the one shown in operation has given good satisfaction.

A decided advantage of the derrick is that the operator has full control of every operation, including the



Fig. 2.—The Lidgerwood Hoisting Engine as Installed for Operating a Mast Hoist.

application of power, while he stands constantly facing his work. The hoist meets the conditions for compactness as it eliminates the space necessary for the leads where full wheel derricks and separate hoists are employed, and it is adaptable for the operation of two booms mounted on a single traveler. The hoist is operated by a 250-volt direct current electric motor, and is also made to operate an alternating current with induction motors. It has a nominal capacity of 4000 lb. lifted at a speed of 130 ft. per minute. The drums, which measure 12 in. in diameter and 19 $\frac{1}{4}$ in. in width of face, are each complete with brakes, ratchet and pawl.

In addition to the regular brakes operated by foot levers, the hoist is fitted with electrical solenoid brakes, which in many cases are desirable for added safety. The solenoid brake is applied to the shaft of the electric motor, and when the operating current is turned on the motor it passes through the coils to the solenoid, lifts the armature and automatically releases the brake. When the current is shut off, or in case of its being cut off by accident, the armature falls and its weight sets the brake with power sufficient to hold the entire load of the hoist. According to tests made by the New York Edison Company in handling loaded buckets weighing 2200 lb., the derrick requires only $\frac{1}{2}$ kw.-hr. of current to complete a cycle of operations, such as lifting a bucket out of a caisson through the air lock, raising the boom and swinging it through an arc of 45 degrees, returning the boom to its original position and lowering the bucket to the bottom of the caisson.

It has been suggested that the little Turbinia of England, which was the original turbine driven vessel of the world, be preserved as a record of one of the greatest events in modern marine engineering. The boat, which had originally one shaft and one propeller driven by one turbine, has now three shafts and nine propellers driven by three turbines.

The Evolution of the Sheet Mill.*

BY W. C. CRONEMEYER, M'KEESPORT, PA.

The First Plant at Pittsburgh.

In the United States the rolling of iron sheets was first started early in the nineteenth century. It appears that the first, or at least one of the first, American sheet rolling mills was built in Pittsburgh in 1818. In Swank's "Iron in All Ages" we find a quotation from the Pittsburgh Almanac of 1819 as follows: "A very extensive establishment under the superintendence of Joshua Malen, formerly of Valley Forge and whose talents will be an important acquisition to this section of the Union, has been made by the Pittsburgh Steam Engine Company. At their mill, which has two engines, each of 120 hp., will be manufactured bar and rolled sheet iron."

The location or the identity of this plant I have not been able to ascertain, nor whether it ever went into actual operation and produced rolled sheet iron in those early days. The first distinct records I have been able to find of sheet iron making in America are those of the works of Alan Wood near Wilmington, Del., where nail plates were rolled as early as 1812 and thin sheet iron about 1829. Marshall's sheet rolling mill near Newport, Del., was built in 1836 and several more sheet iron works were established in Delaware, eastern Pennsylvania and New Jersey between 1840 and 1860. Alan Wood, the grandsire of the Wood family whose name has become famous in the sheet iron industry, removed his works to Conshohocken, Pa., where the now extensive works are still in possession of and are operated by the grandsons and great-grandsons of the founder. W. Dewees Wood, one of the sons of Alan the first, was the founder of the planished sheet iron works in McKeesport.

In Pittsburgh the production of thin sheet iron began to flourish during the fifties and sixties of the last century, especially after the Civil War, when a high protective duty was imposed upon such as well as other products; a large number of the owners of sundry iron works then added one or more trains of sheet rolls to their respective establishments and operated them in connection with their merchant mills. At that time Jones & Laughlin, Shoenberger & Co., A. M. Byers & Co., Zug & Co. and others were making common sheet iron along with their other products. Prominent among those who confined themselves to sheet iron exclusively or made them their chief product were Moorhead, McClean & Co. and Eversen & Preston. The oldest sheet iron mills west of Pittsburgh are, I believe, the Falcon Works at Niles, Ohio. After 1875 the production of common sheet iron increased rapidly and a large number of new works were built in western Pennsylvania and Ohio.

Eastern and Western Types of Mills.

As the light sheet iron industry grew in both the East and the West, two distinct methods and two different kinds of product were developed. In the East prevailed what was called the loose mill, or the Philadelphia style, while in the West the tight mill, or Pittsburgh style, was adopted as a rule. The difference in the two styles of rolling and the subsequent product consisted chiefly in the fact that the Eastern mills used one piece of thin flat bar for each single sheet and the Western mills would produce two to four sheets of gauges lighter than No. 22 from one piece of thicker bar. In the Eastern style the bars having been cut into lengths which corresponded with the required width of the finished sheet, were first rolled single in a roughing mill to about No. 16 gauge. Of the plates thus obtained from two to six, according to the required thickness of the finished sheets, were matched—that is, they were placed on top of one another, a sprinkle of charcoal dust being thrown between the several layers. The pack thus obtained was then reheated and rerolled until it became too cold for further easy stretching, when the several sheets in the pack would be separated and the pack so rearranged that the sheets which had been on the inside would come to the outside and *vice versa*. A further sprinkle of charcoal dust was then applied either before or during the subsequent rerolling. The charcoal dust was used mainly to prevent the sheets from

sticking or welding together. By such means the latter could be subjected to a much higher degree of heat and would consequently stretch more quickly than if no dust had been used. The rolls were kept cool by squirting water on them. In this manner the sheets came out with a cover of black oxide and a surface of practically uniform color, which offered considerable resistance to further oxidation. The still adhering black dust, however, was a rather disagreeable feature for the sheet iron worker. The finished sheets after being trimmed or sheared to correct sizes would be annealed in an open fire, generally after the day's task of rolling was completed, in the same furnace in which they had been previously heated during the rolling process.

The Doubling System.

I believe the principal feature of this system still prevails in the East, although many improvements have been made in the finishing processes. In the rolling of sheets not thinner than No. 21 gauge, there was no material difference between the East and the West; but for rolling sheets No. 22 and lighter the Western mills with, as far as I know, but the one exception of the W. D. Wood Company in McKeesport, adopted the doubling system. In this system two pieces of bar constitute a pair. The two pieces are brought out of the furnace simultaneously and pushed through the rolls, one right after the other, until they are down to about No. 12 or 14 gauge. The pair is then matched and put back in the furnace, reheated and rerolled, and the pack is bent over in the middle and doubled, so that there are now four layers in the pack. The pack is heated again and rolled out to the required length. Sometimes as the required thickness and length of the sheets demand, three single sheets are matched so as to make a final pack with six layers. Sometimes when very thin sheets are to be produced, packs with four layers are doubled, heated and rolled again, so as to make a pack of eight layers, and in recent years as many as 16 sheets are rolled in a pack. In this process no dust or welding preventer is used between the sheets, and therefore they must be rolled at a lower heat, and the raw material must be of a quality that will not weld too readily at that heat. The surface of the rolls, which expand in the middle as they get heated up, must be turned to a concave shape; that is, their diameter must be slightly smaller in the middle than on the ends. The doubling of the sheets, which was in the early days accomplished by beating down the bends in them with big wooden mallets, is now almost universally done by mechanical devices attached to the shears with which the rough edges and ends are cut from the sheets during the process of rolling, or by separate machines.

After the packs have been trimmed or sheared to correct sizes the several sheets are separated or opened and as they generally adhere pretty tightly it requires some little strength and skill to separate them. While the two outside or top and bottom sheets of the pack which have come in direct contact with the rolls have a smooth oxidized and uniformly colored surface, the oxide on the inside sheets is very thin and when the sheets are torn apart will adhere in spots or flowers, sometimes on one and sometimes on the other sheet, leaving a corresponding clear or deoxidized spot on its mate, and thus bring about a variegated surface. While such sheets are not as desirable as the Eastern style product for stove pipes and other similar purposes, where the surface is to remain in its natural state, they are more serviceable by far when the adhering oxide is to be removed or they are to be coated with other substances or are covered up otherwise. In the early days many of the Western manufacturers annealed their products in open furnaces, the same as was done in the East, but now all light sheets are annealed while packed in closed boxes—unless it be that during the last year or two the quick open fire annealing process has been found to be more serviceable for certain purposes of work.

The main principles of the two different styles or processes which I have tried to describe to you still prevail in the making of the ordinary finished or common grades of sheets; but on the basis of both of them considerable progress has been made in the production of more highly finished sheets.

* From a paper read at the April meeting of the Engineers' Society of Western Pennsylvania, Pittsburgh, Pa.

The Bray Mill.

During the last two decades several inventors and mill designers have tried to break away from the old-time methods of rolling sheets, and quite a number of patents have been issued on improved sheet rolling mills, but of all of them only the most recent one has entered into actual practice. I refer to the Bray mill, which now bids fair to be the means of eventually revolutionizing the old methods.

The Bray mill might be called semicontinuous. It consists of a large, continuous bar heating furnace in which the bars are heated while they are carried by an automatic device from the charging end to and out of the discharging end of the furnace, where they drop on the fore plate of the mill and are carried successively through four or five pairs of rolls set tandem. When the plates emerge from the last of these they are in the shape of singles, so called. By a mechanical device every alternate plate is arrested after it emerges from the rolls until the next sheet is also out and lies on top of the first, thus forming a pair. The pair moves along again until it rests under a pair of rolls, arranged side by side horizontally; then a pusher strikes the pair of sheets from below, bends it in the middle and pushes it into the nip of the horizontal pair of rolls, from which later it emerges as a pack of fours which is taken over to the black plate finishing mill to be reheated and re-rolled to a finish.

The First American Planished Sheets.

The first and tolerably successful attempt to bring out in the United States a highly finished sheet iron product that could compete with the glossy and uniformly blue colored Belgian sheets, and especially also with the Russian iron, of which large quantities were imported every year, was made by the Alan Wood Company of Conshohocken, Pa., about 1865. The Counts Demidow, who were making the Russian sheet iron with the help of their serfs in the depths of the Ural Mountains, kept their process a profound secret, and it was then generally believed that such fine material could be produced only from the peculiar kind of magnetic ores which were found in that region. But the Woods proceeded, nevertheless, on the basis of their own methods by thoroughly cleaning their charcoal iron sheets, removing the heavy oxide by means of acids, reoxidizing and rebluing the sheets, and polishing them in highly ground chilled rolls. About the middle of the sixties W. D. Wood branched off from the parent concern and came to McKeesport, where he carried on experiments on an extensive scale in annealing, cleaning, oxidizing and polishing processes. About 1872 he started to give the material a highly finished mottled surface by polishing the sheet under planishing hammers with large chilled face dies, and thereby gave it the appearance which was one of the chief peculiarities of the Russian iron. From year to year the product has been further improved, so that the sheets which are now being turned out at the works (which in 1900 came into possession of the American Sheet Steel Company) surpass the original Russian product in finish and uniformity of gauge, and have driven the latter out of the American market almost entirely.

Pickled and Cold Rolled Sheets.

In 1870 or 1871 Rogers and Burchfield commenced at their works at Apollo and Leechburg, Pa., the manufacture of cold rolled and pickled and cold rolled sheets. William Rogers came here from Great Britain, where he had learned the art of producing fine sheets in the Welsh tin plate works, and succeeded from the start in turning out a superior product which found large demand. His methods were in principle the same as were in vogue in the other Western mills, but by cautious heating, avoiding scaling or heavy oxidation and by keeping the hot mills and cold mills in good trim and the rolls well polished, he managed to turn out a product superior to the regular run of common sheets of those days, and which were to form the basis for further manipulations.

The raw material used was principally charcoal iron bar, made from hammered blooms, and if puddled bars were used they were as a rule refined by forming a pile of them, putting a charcoal bar on the bottom and the top of the pile, reheating that pile and rerolling it into

the required sheet bar. To produce extra fine qualities for stamping purposes, &c., the refining process was even further extended by piling best refined charcoal iron bar, reheating it, forming it into a billet under the steam hammer, again heating it and rolling the finished sheet bar.

If the sheets were intended for purposes that required simply good material with a smooth surface, they were cold rolled only in polished cold rolls, after they had received their first box annealing, and were then re-annealed to take out the brittleness produced by the cold rolls. But if the material was to be used for stamping purposes, or was to be cut up into smaller pieces in dies, or if it was to be tinned, the scale or oxide was removed from the surface by pickling the sheets in sulphuric or muriatic acid before going into first annealing; then after annealing the manipulations were about the same as with the sheets that were cold rolled only.

The demand for cold rolled and pickled and cold rolled sheets has become very great in late years, but the manipulations in producing these finishes have remained practically the same to the present day, only that the pickling which was formerly performed by hand labor is now done with the aid of pickling machines.

The Introduction of Soft Steel.

While the industry was thus growing an entire new feature entered into its development—viz., the use of soft steel. The first attempt to roll soft Bessemer steel into sheets was made in 1876 at the United States Iron & Tin Plate Works, of which I was secretary and business manager. Our works were built for the purpose of making tin plates, but we found that without the protection which was bestowed upon all kindred industries, but was denied to tin plates, we could not make the business pay, and were compelled to hunt other sources of making a living. At a visit to our neighbors, the Edgar Thomson Steel Works, which were built at the same time as ours, where Capt. William R. Jones was superintendent and H. Preusse, chief chemist, I saw a large pile of rail bloom ends for which the manufacturers had no special use. Previous to this we had filled some orders for shovel and scoop iron, which required tough stock with an acid cleaned, or what we used to call pickled finished, surface. It struck me that if we could get the bloom ends reduced to sheet bar they would make good raw material for our shovel stock. Suggesting this to Captain Jones, he took to the idea with celerity and agreed at once to roll the ends into a shape of billets that would fit our bar rolls so that we could break them down into the proper size sheet bar. The experiment was a success from the first. The plates we rolled were from 14 to 17 gauge, or singles. When our superintendent found how well the steel worked into singles he tried to work the stock in doubles and fours, but being rail carbon stock, it was too hard and stiff. Eventually Captain Jones made a special mixture for a charge of low carbon steel for our purpose, and this experiment again proved a success, in the bar mill as well as in the sheet mill, and in the pickling, annealing and tinning process. We found that the wasters, or seconds, in tinning were only about 10 per cent., while with the use of charcoal iron we had often more than 25 per cent. We were then living in the hope that this discovery might help us to continue the manufacture of tin plates, but at that time steel billets were costing \$55 to \$60 a ton, against \$28 for muck bar and \$36 for charcoal blooms, and the iron workers, thinking that they must get some benefit from the innovation, demanded 15 per cent. advance in their wages for working such product. Thus the advantages gained were not sufficient to overcome the many obstructions to the progress of tin plate making, and we had to give up the manufacture of the latter in spite of the new discovery. However, we continued to use the soft Bessemer in many of our other black products, and other mills began to use it soon after. It appears that the use of soft steel in the making of sheets and tin plate was not introduced at the English mills till about 1879 or 1880. Inasmuch as the surface of sheet steel is much cleaner and denser than that of iron, it can be blued or oxidized more readily.

How the use of soft steel for sheet purposes has grown and how it has displaced iron almost entirely is a matter of recent history.

Special Shaw Cranes for Panama.

For handling miscellaneous freight at the Laboca wharf, which is the Pacific terminus of the Panama Railroad, the Shaw Electric Crane Company, Muskegon, Mich., has now under construction a lot of eight special cranes. The crane is a special crane in the fullest sense of the word, nothing of the sort ever having been built before, and it would be difficult to classify it under any of the type names as now applied to cranes. Perhaps as good a name as any would be—an adjustable jib traveling crane, although the cantilever tips, unlike a jib crane. In effect it combines the functions of a jib crane, a boom crane and a traveling gantry crane, with the exception that the boom does not swing on a vertical axis. The cranes were designed to meet the peculiar conditions existing at the wharf, among which might be mentioned the tidal variation of about 20 ft.

The boom, which is 80 ft. long, is shown in Fig. 1 in

from the front of the warehouse to the edge of the wharf was sufficient for a track of only 11 ft. gauge. This, together with the necessary height and reach, made the question of stability a serious one. Although the weight of frame and machinery has been so disposed that the crane will be stable with a load 25 per cent. above normal capacity in the extreme position, clamps have been provided which are always in engagement with the rear rail, to prevent the crane from tipping if a load should become fouled on a hatchway or other part of the vessel.

The crane is mounted on six wheels, four under the front and two under the rear. Anticipating the possibility of uneven settling of the wooden roof the wheels are carried in equalizers so arranged as to compensate for any probable irregularities of track without straining the structure. The machinery for the various movements is placed in the base of the tower, adding to the stability of the crane, and giving easy access for inspection. For convenience in shipping and erecting each set of ma-

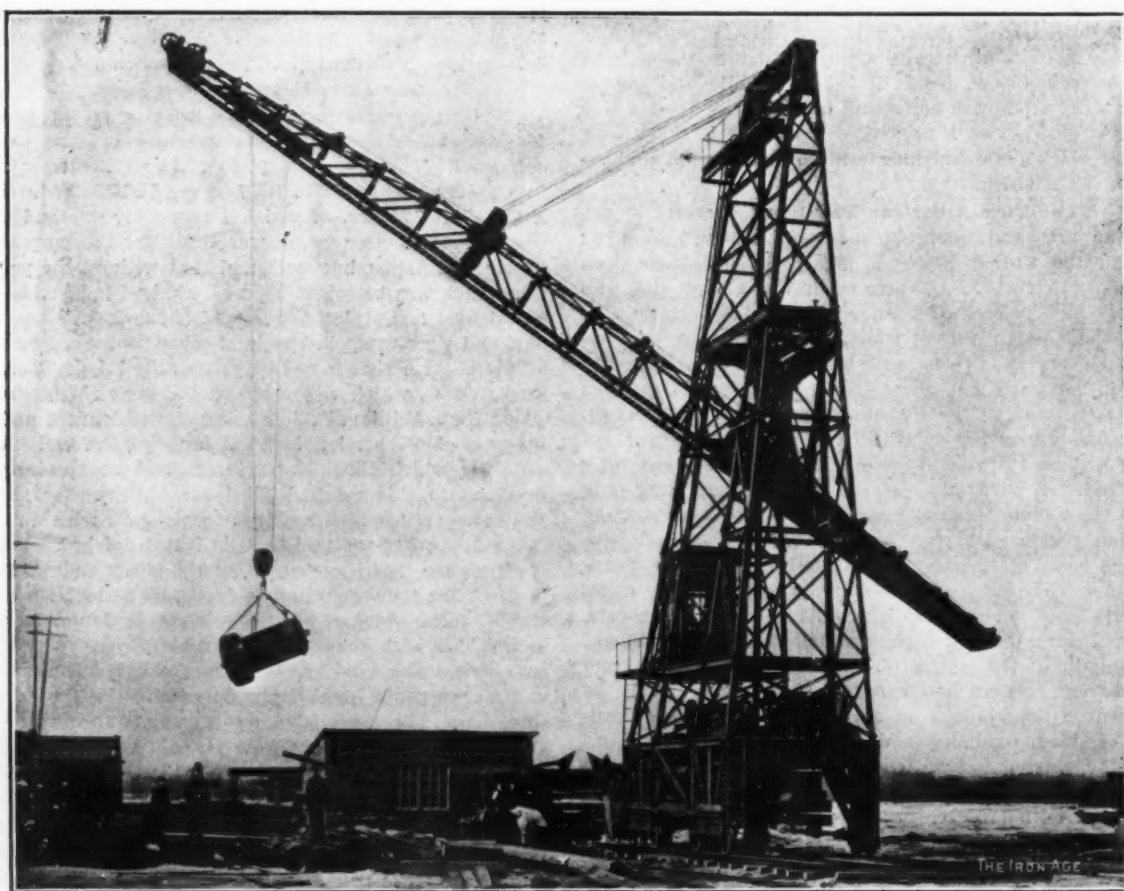


Fig. 1.—One of the Eight Special Cranes Now Being Built for the Panama Railroad Company by the Shaw Electric Crane Company, Muskegon, Mich.

its working position, standing at an angle a little over 30 degrees from horizontal. It was required that the outer end should stand at sufficient height to carry loads over the decks of the largest vessels at high tide, while the inner end must be low enough to project inside of the warehouse door. The boom may be raised to the position shown in Fig. 2, carrying the outer end clear of all parts of vessels and withdrawing the inner end from the warehouse. With it in this position vessels may be docked and the cranes placed opposite the various hatchways in proper position for loading or discharging cargoes. The crane is controlled by cable at any position.

The main frame or tower is of steel construction and stands 62 ft. above the track. There is a clear opening through it 10 ft. wide, in which the boom is suspended and through which the loads are carried. The base, which is 28 ft. 10¼ in. in length, is so constructed that the crane can travel over freight piled to a height of 6 ft. between the tracks, and so that goods may be trucked directly from under the crane to the warehouse. The space

chinery is mounted on a separate frame, which is easily handled and put in place.

The crane has a regular working capacity of 4 tons and a reach of 40 ft. from the center line between rails to the extreme outer position of the load. The total height of hoist is 70 ft., and the hoisting speed with full load is 150 ft. per minute. The load can also be racked out and up at a speed of 150 ft. per minute. The other two movements, the traveling of the entire crane and the hoisting of the boom, are relatively slow, being required only in setting the crane in position for service. The travel is operated by chain drive from a shaft driven by the motor to sprockets on the truck wheels. The other movements are obtained from drum hoists of the usual motor driven type.

The hoist is operated by a 65-hp. motor, the rack motion by a 40-hp. motor and the travel and boom hoist by 24-hp. and 8-hp. motors, respectively. The voltage is 220 direct current. Automatic switches are provided to prevent over travel in hoisting and racking out, and an over-

load switch for the hoist machinery. All movements are under control of one operator, whose cab is so located as to give him the best view of his work. The crane weighs nearly 50 tons, and with the boom in the raised position, as shown in Fig. 2, stands 90 ft. above the wharf.

The motors and controllers, as well as all structural



Fig. 2.—A View of the Special Shaw Crane with the Boom Raised.

work and machinery, are the product of the Shaw Electric Company's plant at Muskegon, Mich.

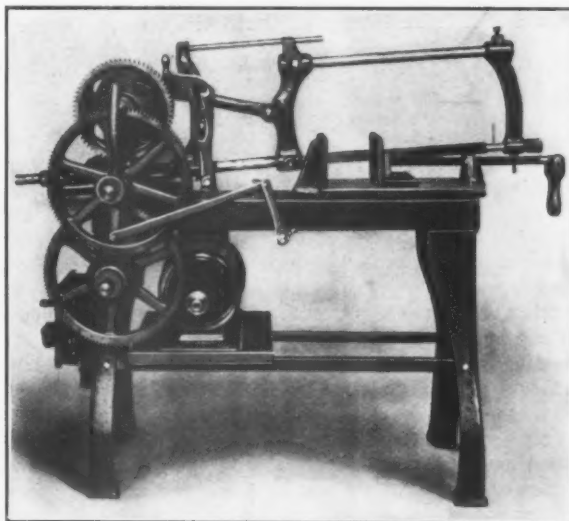
Cooling and Humidifying Textile Mills.—W. H. Carrier, engineer of the Buffalo Forge Company, Buffalo, N. Y., read a paper before the recent annual convention in Philadelphia of the American Association of Cotton Manufacturers on "A New Departure in Cooling and Humidifying Textile Mills." This paper describes the fan system by which the various departments of a cotton mill are humidified and cooled in summer by artificial ventilation with cold saturated air, and are humidified and heated in winter by first saturating the air at the proper temperature and then heating the air after saturation to a temperature sufficient to maintain the required temperature and humidity conditions in the room. The system is thoroughly explained, both by lucidly written text and carefully prepared drawings. Tables of tests at various mills are presented as part of the paper, showing the success derived from the application of the system.

A Robertson Motor Driven Hack Saw.

Electric motor drive, as applied to the No. 3 rapid cut power saw made by the Robertson Mfg. Company, Buffalo, N. Y., is herewith illustrated. Because of the many uses and applications of these machines compact and close connection was desirable, and was obtained by mounting the motor under the bed at the rear end, where it occupies no extra space. The starting box is mounted on the outside of the legs, also at the rear end. The pinion on the motor and the intermediate pinion are of fibre, metal bushed for set screws. The other gears are cut from solid metal. The motor is of $\frac{1}{4}$ hp. and is furnished for either direct or alternating current.

The saw is of the company's regular type, having an automatic stop gravity feed and quick starting clutch. The one illustrated has an adjustable frame capable at its greatest extension of using a 17-in. blade for cutting stock up to 8 x 8 in. For smaller work a shorter blade can be used by adjusting the outer arm on the top bar. The equipment is one especially useful for cutting long stock in all shapes.

The demands for these machines is reported to have



Geared Motor Drive as Applied to the No. 3 Rapid Cut Power Saw Made by the Robertson Mfg. Company, Buffalo, N. Y.

so increased in the past five years as to have caused the company to extend its line from the No. 1 size first made, having a capacity of 4 x 4 in., until to-day eight sizes are built, the largest cutting up to 12 x 17 in., rounds or squares, and angles, tees, I-beams, &c.

The Electric Outfit of the Dreadnought.—On the British battleship Dreadnought, which has created so much discussion and speculation, the electric outfit is unusually complete. At the top of the foremast, and immediately above the forward funnel, is the fire control platform, upon which are placed the range finders, for locating the position of an enemy or target at sea. In the turrets and on this platform is installed a new automatic system of range finding and gun elevating, by means of which the range as read will be electrically transmitted to each gun position, where, by the use of synchronized motors, the elevation of the guns will be steadily and continuously changed to correspond with the increasing or decreasing range, as recorded by the range finder on the platform. This method is said to remove all possibility of error in the transmission of information as to the ranges and in the manual elevation of the guns, and leaves to the gun crew merely the duty of traversing the guns, and thus keeping them fixed upon the enemy. The lofty foretopmast places the fore truck fully 200 ft. above the water line. A short mainmast is carried in the usual position, mainly for the support of the antennae of the wireless telegraph equipment.

The Universal System of Machine Molding.

BY E. RONCERAY, PARIS, FRANCE.

It may be presumption for an inhabitant of the old Continent to come to the United States to talk to foundrymen about an improvement in molding machines. Yet I have heard that while you are quick to improve your methods you also welcome new things, provided they are good, and I have been told that mine are good. If our

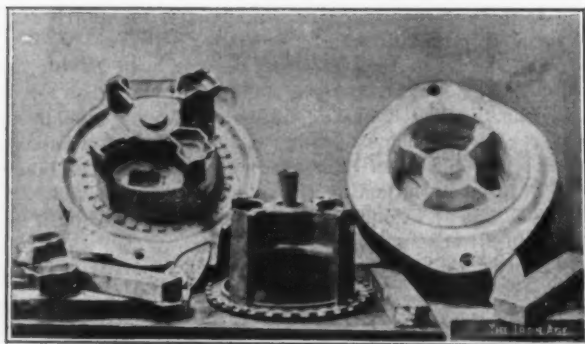


Fig. 1.—Nine Stripping Plates and Four Plugs in the Two Bottom Plates.

solution of the problem of machine molding is different from any thus far put forth in the United States, perhaps it is because our conditions are so different. In the United States you have a market not only larger than the French, English, or German markets separately, but even larger than all the European markets combined. Consequently, when we Frenchmen have an opportunity of making one dynamo you can make 100; where we make 10 gas engines you make 1000, and where we make 100 castings you make 10,000. This is enough to show how different are the problems we have to solve, even when they appear to be the same.

Receiving such large orders, you do not hesitate to spend money on pattern plates and special molding machines, the expense per casting being reduced to a trifle on account of the quantity of castings you have to make. You have gone as far as to design the castings and make

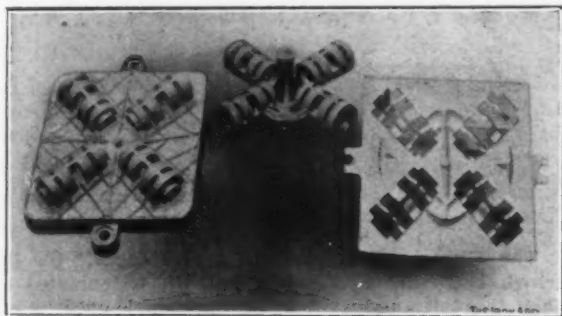


Fig. 2.—Stripping Plate Which Is Also Part of Pattern and Core Print.

the patterns to suit the molding machines. In France we have had to deal with small orders, with patterns made for molding by hand, and the castings are very often designed by draftsmen who have never seen a mold in their lives.

We have had to find something to meet the demands of our growing automobile industry. Up to the present time, in France this industry has not been standardized, and consequently the castings are the most intricate that can be found. Furthermore, these castings are always wanted in a hurry. Consequently, the orders being small, we have had to make our pattern plates quickly and cheaply, and to make them from the ordinary wooden patterns for any intricate casting. After that we had to design machines for using these pattern plates and making castings from them. There is no need of telling you

that the problem was rather difficult. Nevertheless, after heavy expense, much time and with the help of several bright foundrymen and mechanics, it has been solved.

The pattern plates we make, which are covered by several patents, are of different types, or rather, are a combination of different systems. The whole system has been devised with a view to making pattern plates and stripping plates in the foundry, without the help of the machine shop. There is no need of mentioning to an assembly of founders the trouble and delay involved in obtaining a pattern or a pattern plate from a machine shop; and when after much difficulty and wasted time it is secured, in most cases it is useless.

To make a good pattern plate it is necessary for one to be a good molder, a good fitter and a good pattern-

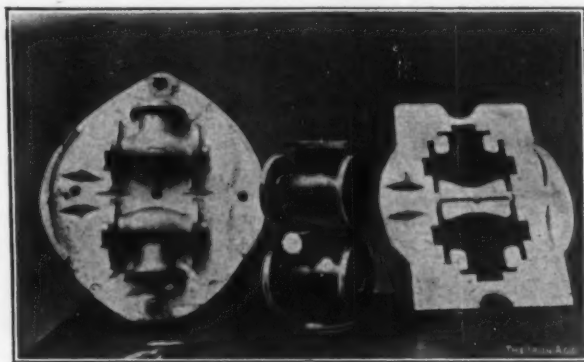


Fig. 3.—Plain Stripping Plate.

maker, accomplishments rather difficult to find in the same man. Our processes have the advantage of obviating these difficulties and result in a considerable reduction in the cost of pattern plates. Our patterns are adaptable to any castings required by the trade, provided 50 castings or more are made from the same pattern.

It is needless to emphasize the fact that these results will widen considerably the field of machine molding, which up to the present has been confined to a definite class of work. According to my understanding of the situation, I claim that 10 per cent. of the total tonnage of castings under 500 lb. have been machine molded

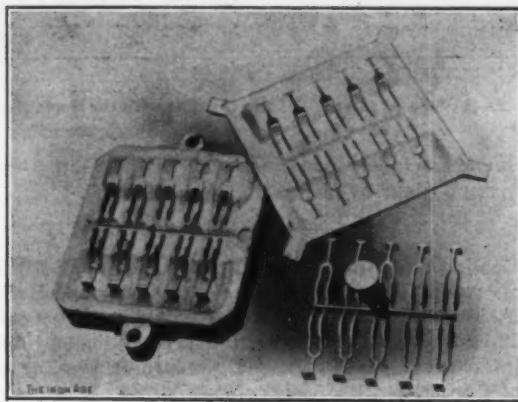


Fig. 4.—An Example of the Pattern Plates Used.

up to the present, 50 per cent. at least will be molded in the future by the use of these new methods.

One of the main points is the method of making stripping plates. Every founder knows the numerous advantages of stripping plates and also the various schemes that have been invented to do away with them, on account of their high cost and the impossibility of adapting them to crooked joints or intricate castings. In spite of the ingenuity spent here in power ramming machines,

hand stripping plate machines still have a good reputation, and are certainly capable of turning out fine castings. The way we make stripping plates enables the founder to use them in profusion whenever there is the slightest danger of the sand breaking, or, as we express

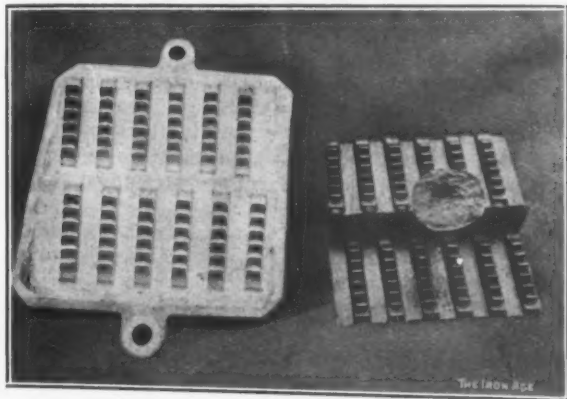


Fig. 5.—Castings Set Edge to Edge to Economize Space.

it in French, he uses the stripping plates, "à toutes les sauces." The result is that we are absolutely certain of getting a good mold at each ramming, as far as this side of the question is concerned.

Figs. 1, 2 and 3 illustrate clearly to what an extent we use stripping plates, and an inspection of them will quickly show that no fitting has been done. These strip-

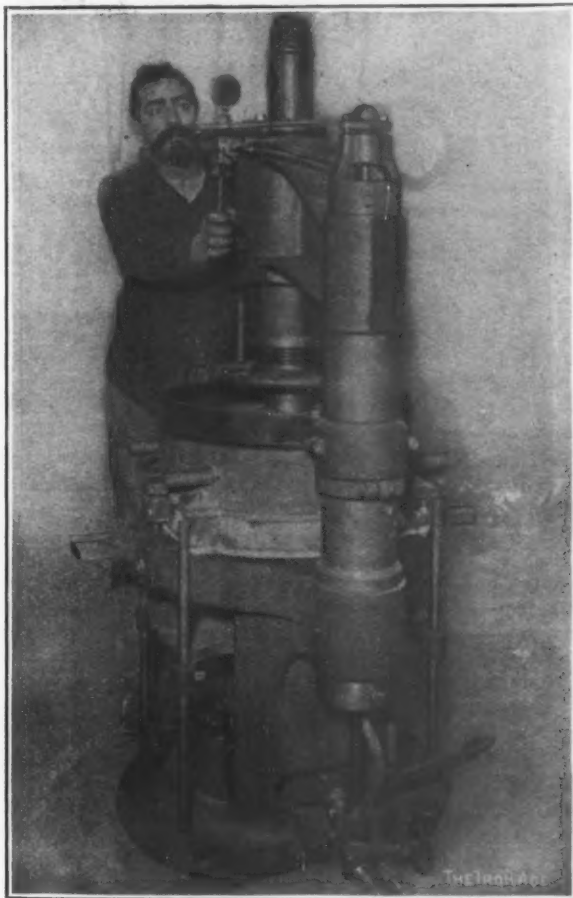


Fig. 6.—Molding Machine with Swinging Head.—Ramming the Mold.

ping plates are usually made of a noncontracting metal, but in special cases they can readily be made of cast iron. A considerable number of loose parts can be used on certain plates. For aluminum casings for automobiles not less than 25 stripping plates are used and very often we take twice as many.

When the casting is not very large and is of such shape as to allow it, we use reversible plates, disposed with top and bottom of the same pattern side by side,

so that two flasks rammed on the same pattern plate constitute a complete mold. Similar work has previously been done by setting half patterns on a plate, but in our process we obtain it simply by molding, even if the joint is very crooked, and the pattern plates thus obtained are always absolutely accurate. Fig. 4 shows an example of this arrangement which has proven to be most useful

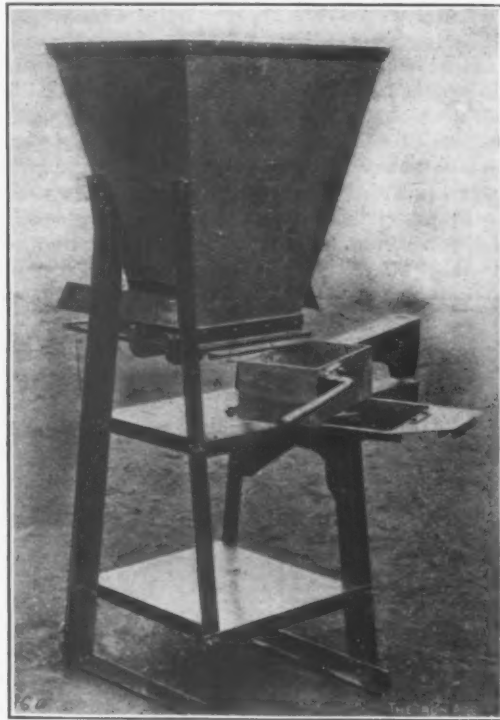


Fig. 7.—Automatic Sand Distributer.

in a number of cases. A peculiarity of this reversible system is that, when a side of the casting is flat, or almost flat, a great saving in space is effected by setting castings edge to edge. Fig. 5 shows a good example of this arrangement which effects a saving of 30 per cent. of space in certain cases.

A special application of the reversible process is its



Fig. 8.—Molding Machine with Sand Distributer.

use for making what we have called "cliche." The cliche is a small reversible pattern plate, entirely metallic, of constant width but of variable length, containing as many of the articles to be molded as can be inserted in its surface. These cliches, which are readily obtained,

are inserted in a special frame called a cliché table, the number of them varying according to their length, and this table itself forms a reversible multiple pattern plate, variable at will in its composition.

The main advantage of the cliché system is that the founder can easily remove and replace any of the clichés from the cliché table, and never make more molds than are required of any pattern ordered, which is an important saving. The clichés are kept in store and are always ready for any repeat order of the same article.

It is necessary to add that the time of manufacturing a pattern plate, by these processes, varies from 1 to 2 hr. for a cliché, to several days for the most complicated plates. Perhaps it may be well to state that the pattern plate, as we have conceived it, is a strongly built contrivance, strong not only by reason of its elements, but more especially in its design. It is composed, as a rule, of a base formed by an iron frame filled with plas-

To operate our machines we use hydraulic power, instead of compressed air generally used here. I fail to agree with most of your manufacturers, who hold that compressed air is necessary for machine molding, and I will explain my reasons for this. Compressed air is usually available at a pressure of 80 to 100 lb. per square inch. This low pressure leads to the adoption of a big cylinder to obtain sufficient pressure to ram the mold; but as a rule the static pressure, even with such big cylinders, is not sufficient, and it is then necessary to give blows. You have all experienced this action, which is much like that of a steam hammer, and you know how destructive it is, both to the pattern plates and the machines.

Regarding the drawing of the pattern, compressed air, being an elastic fluid, is not at all adapted to this kind of work and to properly perform this operation it has been found necessary either to draw the pattern by hand or to use what I have no hesitation in calling very ingenious devices, but which are somewhat complicated.

Hydraulic pressure can be obtained high enough to use static pressure for ramming with reasonable sizes of

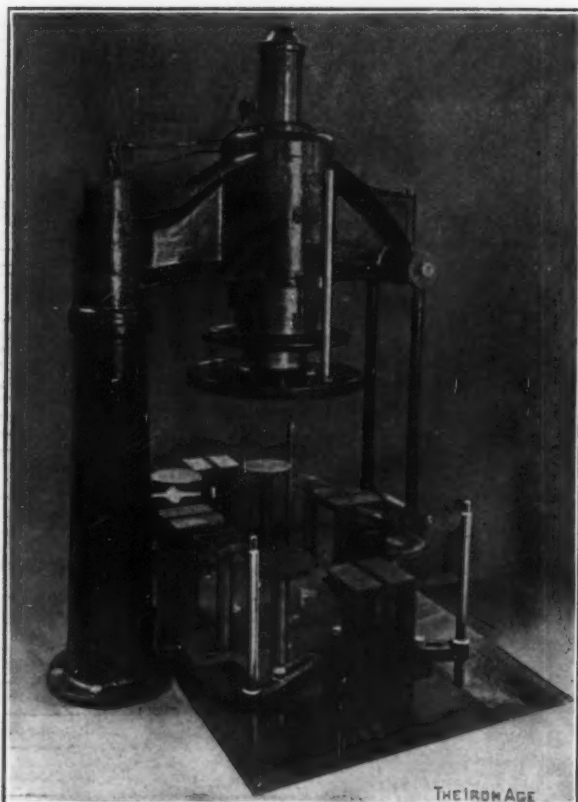


Fig. 9.—Machine Designed for Large Work.

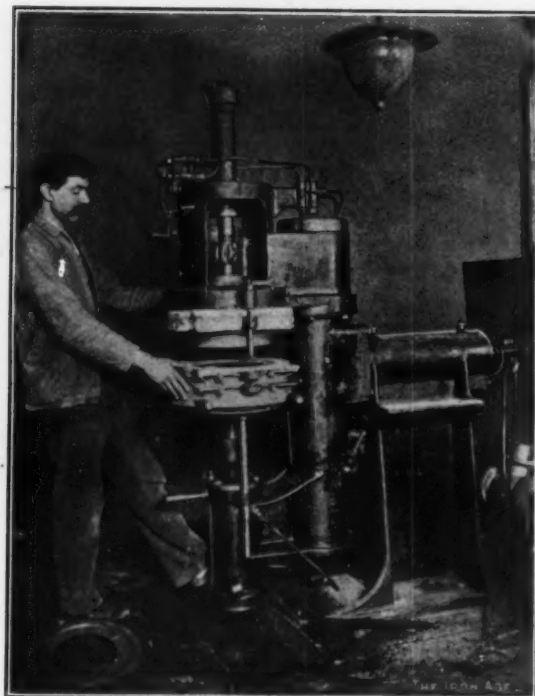


Fig. 10.—Swinging Machine.

ter, upon which are set the patterns composed of a thin shell of white metal filled with plaster, on which they rest during the ramming action. It is evident that they are quite different from the pattern plates and stripping plates known in America.

I will now discuss the machines we have designed to complete this line of new devices. We, of course, can use ordinary pattern plates, and with slight alterations, even vibrating pattern plates. But our machines give their maximum results with our system of pattern plates and stripping plates.

Makers of molding machines have numerous styles, and in each style a number of sizes. It is generally claimed to be a talking point. We, on the contrary, excepting a few special machines only used for very special cases, have only two styles of machines and each style is limited in sizes. Each of our machines can handle all sorts of castings up to its maximum capacity, from the most simple up to the most intricate, using flasks of many different sizes and shapes up to the maximum capacity. This is the reason we have called our machine Universal. The Universal machines are made standard and swinging. The former are in six sizes ranging from 10 x 10 in. flasks up to 5 x 4 ft. flasks and even larger; the latter are in four sizes covering the same range, making 10 sizes in all.

pistons, and I consider this a great advantage. You not only get the exact pressure necessary by the use of a gauge and so have it under perfect control, but also by simple arrangements you can obtain more or less pressure as required, hard in some places and soft in others, which is necessary to obtain good work.

For the drawing of the pattern, the gentle and steady motion of hydraulic power is exactly what is necessary, and permits the use of time saving devices, to which I will refer. Another important point is the power consumed. As an average a compressed air machine requires about 4 hp.; our machines and arrangements accomplish the same work with 1-5 hp. or 1-20 as much.

One may advance the objection that water may freeze in cold weather, in spite of the fact that all modern foundries are heated and many hydraulic appliances are used in metallurgy without trouble. I call your attention to the fact that nothing is simpler than making a return to the tank and then using a nonfreezing mixture, such as alcohol or glycerine, in the water to prevent it from freezing. The piping generally used is very small; it ranges from 3-8 in. inside diameter up to 1 in. for very large plants, but the latter is seldom used.

Our standard machines are divided into two classes, designated as A and M. The difference is only in the detail of the table. The class A molding machine gener-

ally consists of a box or pedestal, the top of which is a table on which the pattern plate is fixed. A swinging beam, pivoted on the back column, carries the hydraulic piston for ramming the sand, and a movable hook placed at the other end of the beam allows it to be fixed in the right position for ramming. The height available above the table can be adjusted by a telescopic screw, reducing the stroke to its minimum in each case and then saving water and time, while striking off sand is avoided owing to the perfectly flat surfaces so obtained. Inside the box is a vertical hydraulic ram carrying a movable table. This ram is provided for drawing the mold from the pattern plate after ramming. For this purpose the table



Fig. 11.—Machine for Small Work.

carries four adjustable brackets holding four vertical rods, which work outside of the body of the machine and engage the corners of the flasks or of the stripping plates, so that an absolutely true lift is obtained.

In a few special cases, where long cores, gears, &c., have to be dealt with, we recommend the installation of the machine with a double ramming device, which insures an equal pressure over the whole length of the core or gives an additional ramming in the weak parts of the mold. The swinging beam has the advantage of leaving the access to the flask entirely free for the operator to move around, which is shown in Fig. 6. Recently the machines have been fitted with a special treadle arrangement for drawing the flask.

A useful addition to such a quick machine is the automatic sand distributor, Fig. 7, which consists of a hopper in which the sand is fed by a mechanical device, depending on the general arrangement of the foundry and under which a swinging box is filled with sand and emptied when above the flasks. The opening and closing of the bottoms of the hopper and box are obtained by a simple motion backward and forward of a lever worked by the man operating the machine. This device saves all shoveling and consequently considerably increases the output. Fig. 8 shows a machine operated in connection with the sand distributor.

Class M machines, Fig. 9, have been designed specially for large work, as mine shafts and tunnel segments, truck bolsters, four and six cylinder automobile casings, large valves, &c. The chief departure from the other machines is in the adaptability of the table to the requirements of the castings to be made.

With the standard Universal machines previously described practically all molds can be produced, but when heavy pockets of sand have to be lifted, the use of gag-

gers becomes a necessity. This renders the ramming uncertain and tedious, and the use of the swinging Universal machine overcomes this difficulty. These machines are also very useful when the sand has no binding power, especially for the production of drags, which, after their ramming on the machine, are turned over into their pouring position. In their main points the swinging machines are very much like our standard types, only having a longer ramming stroke and a shorter drawing stroke; but they are pivoted on a horizontal axle which is placed about the center of gravity of the machine, when loaded with the mold. The operation of these machines is similar to that of the standard machines, but when the mold is under pressure the whole machine, with pattern plate and mold, is revolved 180 degrees, to draw the mold on its base, as shown in Fig. 10.

The swinging machines can occasionally be used as standard machines, and in that case their operation is exactly the same as for the standard type. When used as swinging machines their operation is decidedly different. The ramming piston is not only used for ramming, but also for drawing the mold, and the function of the opposite piston is to help the starting of the sand at the beginning of the drawing operation and then stop, when the mold is out of danger. In fact, the mold is at first supported by the two pistons, the ramming piston carrying the ramming plate, and very often a follow board and the drawing piston, to which are attached our usual stripping plates and stools, instead of being loose, as in the case of the standard machines. At a certain point



Fig. 12.—Large Special Molding Machine.

the drawing piston, together with its attached stripping plates and stools, is stopped while the ramming piston continues the downward motion, thus accomplishing the drawing of the mold.

I confess that when we conceived the idea of this machine we had grave doubts as to its success, and decided to make at first a very small machine. After a good many alterations we were successful; with practice all doubts were dispelled and we have now made very heavy machines of this style for many classes of work.

Fig. 11 illustrates a small machine for 14-in. flasks. Fig. 12 shows a very large special machine made for cotton carding machinery.

Edward W. Stevess has been appointed receiver for the West Penn Foundry & Machine Company, Avonmore, Pa. This company builds rolling mill and plate glass machinery, and also does general foundry and machine work.

The American Society of Mechanical Engineers.

Indianapolis Meeting, May 28 to 31, 1907.

An announcement of the opening of the fifty-fifth convention of the American Society of Mechanical Engineers, at Indianapolis, Ind., Tuesday evening, May 28, appeared in these columns last week. Such allusions as were made to the sessions of the following day were very brief, as it was the purpose to give the report of the professional sessions in a single account after the close of the convention. The following, therefore, covers the proceedings from Wednesday morning to the conclusion of the meeting.

SECOND SESSION.

Following the usual custom business was the first matter of consideration at the second session, which was held in the auditorium of the Claypool Hotel, Wednesday morning, May 29. Immediately after the meeting was called to order the secretary announced the election of Andrew Carnegie as an honorary member, the reason for coupling the honor being very curtly given in the words of his proposers because he is "the greatest iron master the world has ever known."

Submitting the report of the tellers on the election of new members, the secretary stated that 254 members, associate members and junior members had been taken into the society this year, and that 190 applications are now pending. Announcement was also made of the adoption of the amendments to the constitution and by-laws which had been under consideration the required length of time.

On behalf of the committee having that in charge, F. J. Miller outlined the measures which had been taken to raise funds for defraying the society's indebtedness for its part in the land on which the United Engineering Societies building stands. A considerable amount has already been raised, and the balance is to be obtained by subscription from the members. A telegram of congratulation and a request for delegates to the National Irrigation Congress to be held at Sacramento, Cal., next September, was next read, and a motion was carried to refer the matter to the council for such action as it might direct.

The Machine Screw Report.

The revised report of the Committee on Standard Proportions for Machine Screws was presented by Horace K. Jones. This committee consisted of Wilfred Lewis (chairman), Tabor Mfg. Company, Philadelphia, Pa.; Charles C. Tyler, National Cash Register Company, Dayton, Ohio; Horace K. Jones, Corbin Screw Corporation, New Britain, Conn.; John Riddell, General Electric Company, Schenectady, N. Y.; George R. Stetson, New Bedford Gas & Edison Light Company, New Bedford, Mass., and George M. Bond, Hartford, Conn. The revised report recommends changing the screw gauge outside diameters from 0.05784 for the smallest size, with an increment of 0.01316, which makes the outside diameter of the 21 standard sizes 0.45204, to an outside diameter of 0.060 for the smallest size, with an increment of 0.013, which makes the outside diameter of the largest size 0.450. This change enables the United States Standard form of thread to be used without departing from the present pitch diameters which are large on the small screws and small on the large ones. This change also discards many troublesome decimal figures.

Prof. D. S. Jacobus moved the acceptance of the report, which was seconded by A. Bement. J. M. Carpenter of the J. M. Carpenter Tap & Die Company, Pawtucket, R. I., who also represented 10 other screw manufacturers, declared the report to be acceptable to them, and hoped it would be received by the society. E. O. Goss of the Scoville Mfg. Company, Waterbury, Conn., also indorsed the report, and promised that his company would adopt the standards. Summing up, Mr. Jones explained that the proposed standards are as near as possible to the present standards. A motion to accept the report and discharge the committee was carried.

Preliminary Refrigeration Report.

This report, presented on behalf of the committee by Professor Jacobus, was a continuation of the work of the committee, which rendered a report on a standard basis for refrigeration which was accepted at the New York meeting in 1904. The first report defined a standard set of conditions regarding the working pressures and recommended that what was termed the commercial tonnage capacity be based on the actual weight of refrigerating fluid evaporated in the refrigerator. The present report gives directions for conducting tests for determining the items specified in the first report and contains form tables for recording the data. It was submitted with a view of bringing out discussion and with the expectation that corrections or revisions might be necessary.

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where P_1 is the collapsing pressure of a normally round tube and P_2 that of the distorted tube, both in pounds per square inch, and M the maximum divided by the minimum outside diameter at the place of greatest distortion. This formula is strictly applicable to the 10-in. commercial lap welded steel tube 20 ft. long, and ranging in thickness from 0.15 to 0.2 in. With the paper was given a chart showing the results of successive retests on two thicknesses of such tubes of Bessemer steel, from which the following conclusions were drawn:

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An out-of-roundness of 10 per cent., corresponding to a difference in diameter of 1 in. for a 10-in. tube, which is about five times that of the commercial lap welded tube while in its normal condition as to roundness, causes a decrease in the collapsing pressure of about one-third. From this it would appear that a lap welded steel tube when in service, if designed with an ample safety factor, of say five for ordinary conditions, could not possibly fail because of any degree of out-of-roundness that would be apt to pass ordinary inspection.

The author explained that the paper was offered simply as a supplement in response to requests made when

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"The Economy of the Long Kiln."

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At the conclusion of this discussion the session was adjourned.

WEDNESDAY EXCURSIONS.

The limited time and the distance apart of the plants which it was desired to visit Wednesday afternoon made it necessary to arrange two trips, the participation in either of which was at the option of the individual. One party inspected the plants of the Atlas Engine Works and the National Motor Vehicle Company and the other those of Nordyke & Marmon and the Parry Mfg. Company.

The Atlas Engine Works

Includes a large number of buildings and yards, covering about 40 acres of ground, and has an enormous output of steam engines and boilers. It was among the first plants in this country producing heavy machinery to introduce the plan of building for stock in round lots with repetition construction. Originally making but a few types and sizes, it has gradually extended its line, until it now builds nearly every type of boiler and engine and in a very wide range of sizes.

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was organized in 1900 and for a time was confined to the manufacture of electric vehicles, but later entered the gasoline automobile field. It operates two factories, one for the manufacture of the engines and another for the construction of the complete car. The engine plant is considered one of the best equipped of its size in the United States. National motor cars are made, ranging in power from 40 to 75 hp.

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In 1851 this concern was started as a small millwright's shop and has since developed until its buildings represent an aggregate of more than 300,000 sq. ft. of floor space. It is now known as the largest manufacturer of mill machinery in the country, and is also prominent in automobile manufacture, which field it entered in 1902, when it brought out the Marmon gasoline touring car. The mill machinery made includes everything that has to do with the milling of grain.

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The above data concerning these plants were taken from a booklet prepared for the convention by the local Entertaining Committee, which contains, in addition to a considerable amount of general information concerning Indianapolis, descriptions of the plants referred to and the Pope Motor Car Company, E. C. Atkins & Co., the Diamond Chain & Mfg. Company, the Indianapolis Light & Heat Company, Eli Lilly & Co., the Premier Motor Mfg. Company, the Laycock Power House Company, the Chandler & Taylor Company, the Indianapolis Gas Company, Adams & Raymond, the Dean Bros. Steam Pump Works, Levey Brothers & Co., the G. & J. Tire Company,

The American Society of Mechanical Engineers.

Indianapolis Meeting, May 28 to 31, 1907.

An announcement of the opening of the fifty-fifth convention of the American Society of Mechanical Engineers, at Indianapolis, Ind., Tuesday evening, May 28, appeared in these columns last week. Such allusions as were made to the sessions of the following day were very brief, as it was the purpose to give the report of the professional sessions in a single account after the close of the convention. The following, therefore, covers the proceedings from Wednesday morning to the conclusion of the meeting.

SECOND SESSION.

Following the usual custom business was the first matter of consideration at the second session, which was held in the auditorium of the Claypool Hotel, Wednesday morning, May 29. Immediately after the meeting was called to order the secretary announced the election of Andrew Carnegie as an honorary member, the reason for coupling the honor being very curtly given in the words of his proposers because he is "the greatest iron master the world has ever known."

Submitting the report of the tellers on the election of new members, the secretary stated that 254 members, associate members and junior members had been taken into the society this year, and that 190 applications are now pending. Announcement was also made of the adoption of the amendments to the constitution and by-laws which had been under consideration the required length of time.

On behalf of the committee having that in charge, F. J. Miller outlined the measures which had been taken to raise funds for defraying the society's indebtedness for its part in the land on which the United Engineering Societies building stands. A considerable amount has already been raised, and the balance is to be obtained by subscription from the members. A telegram of congratulation and a request for delegates to the National Irrigation Congress to be held at Sacramento, Cal., next September, was next read, and a motion was carried to refer the matter to the council for such action as it might direct.

The Machine Screw Report.

The revised report of the Committee on Standard Proportions for Machine Screws was presented by Horace K. Jones. This committee consisted of Wilfred Lewis (chairman), Tabor Mfg. Company, Philadelphia, Pa.; Charles C. Tyler, National Cash Register Company, Dayton, Ohio; Horace K. Jones, Corbin Screw Corporation, New Britain, Conn.; John Riddell, General Electric Company, Schenectady, N. Y.; George R. Stetson, New Bedford Gas & Edison Light Company, New Bedford, Mass., and George M. Bond, Hartford, Conn. The revised report recommends changing the screw gauge outside diameters from 0.05784 for the smallest size, with an increment of 0.01316, which makes the outside diameter of the 21 standard sizes 0.45204, to an outside diameter of 0.060 for the smallest size, with an increment of 0.013, which makes the outside diameter of the largest size 0.450. This change enables the United States Standard form of thread to be used without departing from the present pitch diameters which are large on the small screws and small on the large ones. This change also discards many troublesome decimal figures.

Prof. D. S. Jacobus moved the acceptance of the report, which was seconded by A. Bement. J. M. Carpenter of the J. M. Carpenter Tap & Die Company, Pawtucket, R. I., who also represented 10 other screw manufacturers, declared the report to be acceptable to them, and hoped it would be received by the society. E. O. Goss of the Scoville Mfg. Company, Waterbury, Conn., also indorsed the report, and promised that his company would adopt the standards. Summing up, Mr. Jones explained that the proposed standards are as near as possible to the present standards. A motion to accept the report and discharge the committee was carried.

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the Rockwood Mfg. Company and the Indianapolis Water Company.

THIRD SESSION.

A group of papers of special interest to the automobile fraternity had been arranged for the third session, which was held Wednesday evening in the same place as the session of the morning. The first of these,

"Ball Bearings,"

by Henry Hess, Philadelphia, was a discussion of their use in general and on automobiles in particular. The paper was an unusually exhaustive one and occupied in itself 40 pages in the society's proceedings, in addition to which there was an appendix of 46 pages dealing with ball bearings for various loads, which consisted of reports compiled from work done in the Central Laboratory for Scientific Technical Investigation by Professor Striebeck, Neubabelsberg, near Berlin, Germany. It was translated from the German and supplemented with a résumé and notes by the author of the paper. The paper being so long, was presented by extracts, which the author illustrated with lantern slides, many of which also appeared in the paper. Briefly, the paper was intended to lay before the society the results of the last decade in the development of the ball bearing from a mechanism considered suitable only for light work, to one suitable under any and all journal conditions, whether of high speed and relatively light load or of slow speed and many tons load; for shafts from a fraction of an inch to those of 40 or more inches in diameter. The various factors influencing ball bearing design, such as load, speed, shock, materials and workmanship, were followed by a consideration of types of mounting and of size selection for a given duty. As the discussion referred more particularly to the use of bearings in automobiles, the reproductions of working drawings were confined to motor car mechanisms. The broad discussion of principles of construction and application was, however, equally applicable to other lines of engineering.

A written discussion was offered by T. J. Fay, New York, on the one phase of the subject—the materials for ball bearings. He had made investigations of ball bearings with respect to life, wear and materials, and gave the gist of his findings. A particularly interesting part was the analyses as obtained by chemical determinations of the composition of various bearings.

The time consumed in the presentation and discussion of this paper curtailed that available for the remainder of the papers, and the next one,

"Air Cooling of Automobile Engines,"

by John Wilkinson, Syracuse, N. Y., was read by title only. The following is the substance of its contents:

The science of air cooling presents two particular phases: the internal and the external conditions. The proper external conditions have not yet been reduced to a science which can be confidently asserted, but the correct internal conditions have been very closely ascertained and in general may be summed up as follows: To present the minimum internal surface to the heat; to make this surface as smooth as possible; to carry off the hot exhaust gases at the bottom of the stroke before the main exhaust valve opens; to get rid of what is left with as little surface contact with the cylinder as possible; to reduce the friction of piston on the cylinder to a minimum; to keep all projections out of the cylinder, and to make the compression just right to fit all other conditions.

This paper passed without discussion, and the third,

"Material for Automobiles,"

was presented by Elwood Haynes, Kokomo, Ind. It was made especially interesting by the passing of specimens about the audience which the author had brought with him, among them being broken test pieces of vanadium steel, chrome steel, nickel steel turnings and pieces of vanadium steel broken by bending. A brief abstract of the paper is here given:

Early experimenters found that ordinary steels would not answer for the construction of parts of an automobile which were exposed to vibratory stress. Swedish iron was of too low elastic limit; nickel steel was introduced, which proved successful. Tempered tool steel was first tried for sliding gears; it proved unsuitable owing to breakage. Case hardened machinery steel was tried, which was better than tool steel, but still unsatisfactory. Nickel chrome steel was introduced with good results, and tungsten chromium steel was utilized for making tools for

turning it. Vanadium steel was introduced with good effect. Aluminum zinc alloys were found unsuitable on account of non-resistance to vibrations; aluminum copper alloys answered much better. Bronzes are strong but have a low modulus of elasticity.

An oral discussion was offered by F. J. Neuman, Chicago, who gave opinions from his experience on various materials.

"Special Auto Steel,"

by Thomas J. Fay, New York, the next paper considered, was presented by extracts by the author. It was a paper of considerable scope, embracing actual tests of current products, methods of arriving at the utility and hardness of the various products, the ranges of uses of the steel, and difficulty in fashioning the products, and special hints bearing upon the subject. The paper clearly represented an intimate acquaintance with the subject possible only by long and tedious experimentation.

Question was raised concerning a number of points in the paper by E. H. Neff, New York. He took exception to some of the terms used in the paper, arguing that they were wrongly applied or were not the correct ones as employed in this country, and especially he censured the author's contention that most machine tools, particularly those of the automatic or rapid production classes, are not suited to the working of alloy steels. In replying, the author made clear the meaning of the various terms questioned, and maintained his position with regard to machine tools. In this he was supported by Henry Hess, whose experience had corroborated the author's in that none but the simplest tools would stand up to the working of some of the new alloy steels.

The lateness of the hour made it necessary to defer the next paper until the

FOURTH SESSION.

which was held in the same room on the following morning. The subject of this paper was

"European Railway Motor Cars,"

and the author, B. D. Gray, Providence, R. I. As the title would indicate, it was a study and account of experience abroad, where railroad motor cars are quite extensively used for passenger and light freight traffic, as feeders on branch and main lines, and in competition with more conventional means of transportation. Under certain conditions they have been found practicable and of decided utility on some of the important systems in England and on the Continent. In many cases steam is the motive power employed, but there is a tendency to use the gasoline-electric combination on cars of 70 hp. or less, for which there are numerous advantages.

The paper was regarded as a valuable one by William Forsyth, in giving the details of European practice. It was his opinion, however, that the best way to handle light traffic is in an ordinary coach drawn by a light locomotive. C. D. Young, Columbus, Ohio, pointed out the difficulties in the way of adopting motor cars on American systems, for example, in many States, the law requires a crew the size of which is prohibitive. Another obstacle is the tying up of freight traffic, if cars are run frequently, as would be necessary for interurban service. He also thought the economy was questionable and believed that electric operation of such cars was likely to prove the successful one.

Prof. W. F. M. Goss also favored a suitable locomotive and an individual car. A written discussion from Harrington Emerson, New York, contended that gasoline is too expensive for such constant and extensive operation and commended locomotives fired with fuel oil as being cheaper and freer from troubles and repairs, as well as being more convenient.

The original plan to devote this session to the subject of superheated steam, with the exception of this first paper carried over from the previous session, was followed out. As the time had already been encroached upon it was decided expedient to read the next three papers on superheated steam at once and discuss them collectively. The papers and short abstracts of them follow:

"The Specific Heat of Superheated Steam,"

the paper by A. R. Dodge, Schenectady, N. Y., described two methods for determining the value of C_p (the spe-

cific heat) and its variation with variation of pressure and with variation of superheat at constant pressure. One method involved reducing the temperature of superheated steam by injecting water until the steam was approximately dry and saturated, and determining the unknown quantity by solving the equation for heat balance, the other quantities being known or measurable. The second method made use of the expansion of initially superheated steam in a throttling calorimeter. The conclusions deduced from the results of a series of tests by each method agreed, and were that C_p increases with increasing pressure, but does not vary with different degrees of superheat at constant pressure. At 15 lb. absolute the value of C_p was 0.48 B.t.u., and at 600 lb. absolute, 0.666 B.t.u., irrespective of the superheat.

"Flow of Superheated Steam in Pipes,"

by E. H. Foster, New York. This paper called attention to the difficulties of obtaining information on this subject from existing power plants, chiefly because of unfavorable conditions in the arrangement of piping and lack of uniformity in covering. From a number of plants enough has been learned to draw these conclusions: That the rate of heat transfer per degree difference in temperature per square foot of surface per hour increases with the velocity; that this increase is more rapid in small than in large pipes; and that the percentage loss in heat decreases with the velocity notwithstanding the rising rate of heat transfer. Systematic tests are necessary to deduce a general law. A high velocity of superheated steam in pipes was recommended, 6000 to 8000 ft. per minute for 100 to 200 degrees of superheat. The conclusions were substantiated by curves plotted from available data in this country and from German authorities.

"Entropy Lines of Superheated Steam,"

by A. M. Greepe, Jr., Columbia, Mo. In this paper the results of the experiments of Knoblauch and Jakob, as presented in the *Zeitschrift des Vereins Deutscher Ingenieure*, are described. The method of using the curves for the determination of the total heat required to superheat a pound of dry steam is explained, followed by a simple graphic method of computing the entropy change from one temperature to another, and by an approximate analytical method which gives close results. These results are plotted on a temperature entropy diagram on which the lines of the total heat are also plotted. Included are tables of entropy change from the saturated point to any point of superheat, in order that the results of the paper may be used for constructing superheat lines on entropy diagrams constructed from other steam tables than those used in the paper.

Professor Carpenter, discussing Dodge's paper, compared results of former observers, all differing both as to absolute value and law of variation of the specific heat of superheated steam. So far results have been considerably higher than Dodge's, and he believed that they would be finally found so. Many experiments have been performed at Sibley College, which have demonstrated the difficulty of accurate work because the value to be measured is relatively so small. He discussed the calorimeter method of determining C_p , giving the equation, and also described details of a number of the Sibley College tests.

H. P. Dirks added something to the information given in Greene's paper concerning the Knoblauch and Jakob experiments, and described the method by which the results were obtained.

Frank Koester, member of the Verein Deutscher Ingenieure, gave a chart for the volume of superheated steam for various degrees of superheat, calculated by Zeuner's formula and compared it with Foster's chart. Concerning the same paper, Max Toltz recounted a test on a 2-in. steam pipe 800 ft. long, carrying superheated steam at 90 lb. pressure, in which it was found that with a velocity of 100 ft. per second the loss per 100 ft. was between 6 and 7 degrees; at half that velocity the superheat was lost entirely. His experience had been mainly with locomotives, and it uniformly confirmed the belief that the less the velocity of the steam the greater the amount of superheat lost.

Speaking on Dodge's paper, A. H. Kreusi explained that the tests were made in a large manufacturing plant and that the results were accepted by the firm. With reference to Foster's paper he gave the results of some of his experiments with steam turbines, with regard to the flow of superheated steam.

Prof. Frank Wagner thought Dodge's results a little erratic, believing that his data and curves do not bear out his conclusions that C_p is independent of the temperature. Greene's paper showed that it is not constant at atmospheric pressure, as assumed by Dodge, which would make the latter's conclusion untrue. Professor Jacobus concurred with Professor Wagner. He had worked with similar apparatus to that used by Dodge in both methods and did not consider his results worth publishing. There are so many mechanical difficulties that he doubted if the results were to be trusted.

At this point a motion was carried to refer to the council with power the advisability of appointing a research committee to make further investigations on the subject of superheated steam. This was proposed in a discussion from Prof. S. A. Reeve on Dodge's paper. He could not get the same results from the author's data and did not agree with his conclusions. It was the difficulty of getting authorities to agree that led him to suggest the committee.

A discussion from Hosea Webster, New York, questioned Foster's conclusions, but he regarded the tables and diagrams as a valuable addition to reliable records of observed conditions. He referred to the work done by Dr. Otto Berner in 1904, whose final conclusions were "that while much information is available as to the generation of superheated steam and as to its action in the engine, we are still, with regard to its exact behavior during transmission, practically groping in the dark." He remarked the danger of erroneous deductions and reasons why accurate observations are difficult and certain precautions necessary. He considered further experiments warranted and suggested that observations should be made along the following lines: Hourly steam weight conveyed through the pipe; hourly condensation in the piping; steam pressure at the beginning and end of the pipe line; steam temperature at the same points where the observations refer to superheated steam, and under the same conditions the quality of the steam at the same points.

The remaining two papers of the morning were next presented for combined discussion. The first, by R. P. Bolton, New York, had for its subject

"Superheat and Furnace Relations,"

In it the author directed attention to the difficulty with present apparatus to obtain a stable temperature or amount of added heat, and criticised modern superheater boilers for not properly relating the superheating surface to the path, volume or temperature of the gases. It is desirable to relate the furnace and superheater so that superheated steam of defined character may be produced in any quantity up to the maximum capacity of the generator, and the author suggested that this could be best accomplished with a reverberatory type of furnace. He believed that stable results are to be obtained by a more thorough study of the combination of grate, arch, walls, combustion space and draft.

"Materials for the Control of Superheated Steam,"

a paper by M. W. Kellogg, New York, and presented for him by his representative, R. N. Ingliss, dealt with the several articles of this class generally used, such as pipe, fittings, valves, joints, gaskets, &c. These subjects were separately treated and the best practice in connection with each in the opinion of the author defined. The effect of heat on the different articles was considered and special emphasis was laid on the forms of joints and construction most commendable.

Hosea Webster believed Mr. Bolton too severe in his indictment of boiler manufacturers, when he had said that superheaters are installed in almost any convenient, inaccessible, out of the way place, and are proportioned without regard to the travel, volume or temperature of the gases. Mr. Webster gave a table of tests on one of the boilers in the Waterside Station of the New York

Edison Company, where a very good performance resulted from the use of a standard superheater as manufactured to-day. He maintained that manufacturers always welcome definite suggestions looking to the improvement of their product.

All of the suggestions in Kellogg's paper were not agreed to by Mr. Foster, who gave recommendations based on his own experience.

Mr. Kreusi gave it as his opinion that very high superheat is not only not economical but is undesirable, and supported Mr. Bolton against the criticism of Mr. Webster, submitting figures in substantiation.

The manner of handling boilers and superheaters was discussed by J. R. Brown, who advocated measures at variance with what is commonly regarded as necessary practice. He also presented a method of determining the ratio of superheating surface to boiler horsepower for a given degree of superheat. Discussing Kellogg's paper he referred particularly to joints, maintaining that threaded joints have worked well when properly made up. Gaskets give good joints, but less depends on their make or type than on the way they are installed. He particularly favored thin corrugated steel gaskets.

Separately fired as against boiler contained superheaters was discussed by Max Toltz, who maintained that the former effect little or no saving in fuel, though the steam consumption is reduced, while with the indirect superheater the saving of both coal and steam is very material. He quoted from a number of tests in support of this.

Professor Goss believed that steam pressures have gone too high in locomotives. Experimental results and general experience seem to justify nothing higher than 180 lb., and he predicted that there will be a falling off in the pressure used in the next few years. There are now less compound locomotives used than five years ago. He stated that locomotive men look to the use of superheaters to warrant the return to lower pressures.

The next paper was a departure from the general subject of superheated steam. Its general title,

"Cost of Heating Storehouses"

had a more especial reference to a comparison of the cost where dry pipe and calcium chloride sprinkler equipments are installed. In the absence of the author, H. O. Lacount, Boston, Mass., the paper was read in abstract by the secretary. The substance of the paper is given in the following:

The wet pipe system of automatic sprinklers gives the best fire protection but requires that the buildings be heated. As storehouses are usually unheated the sprinklers must be installed on the dry pipe system if automatic protection is desired. An investigation during one winter in seven unheated storehouses in different parts of the country indicated:

That the inside temperature changed gradually, not following the sudden changes out of doors, and that the inside temperatures were a fairly good average of the outside temperatures, seldom reaching either the highest or the lowest outside readings. Complete notes were made regarding use of storehouses, weather conditions, &c. Later, tests lasting several days were made in four different heated storehouses to determine the amount of heat necessary to keep the temperature above freezing, say 40 to 45 degrees F., during extreme cold weather. The results indicated:

Quite uniform temperature in upper stories but variable in first story, due to frequent opening of outside doors for shipping; variation in steam consumption corresponding roughly to changes in outside temperature; temperature of condensed steam varied considerably, average being about 200 degrees F.; steam consumption per 24 hr. appreciably greater with say 60 lb. steam pressure during daytime only than with 10 lb. pressure continuously day and night; assuming price of coal \$4.25 per 2000 lb. average cost of steam per 24 hr. per 1000 cu. ft. of storehouse for the three brick buildings tested was \$0.00386; heat required by these tests check within a few per cent. with that estimated by means of formulae developed by certain German engineers. Compared with the cost of dry pipe equipment, the cost of heating in order to permit the use of a wet system would be slightly more, but in general the difference would be negligible.

A written discussion submitted by W. D. Ennis, Schenectady, N. Y., gave an estimate of the costs with respect to the heating of storehouses in support of his stand that a heating system would cost less than a dry pipe equipment. Discussing the same paper, E. N. Trump, Syracuse, N. Y., mentioned the difficulty of keeping an air system tight and of locating leaks. After using three or four dry systems for several years with continual

trouble from freezing of the sprinklers, he tried calcium chloride solution and replaced the dry valves in one or two large sprinkler sections with chloride of calcium. The results were so satisfactory that all of the sprinklers in a large number of the buildings and storehouses were filled with the same solution. The rather full account of the experience with this system and the arrangement of its details was very interesting. Prof. J. H. Kinealy considered a most important point in the paper was that it verified the contention that the lower the steam pressure used for heating the greater the economy.

THURSDAY AFTERNOON

was unassigned, and many of the members took advantage of the opportunity to hear President Roosevelt's address at the unveiling of the monument to General Lawton. The customary reception took place Thursday evening and was followed by a dance in the ballroom of the Claypool Hotel.

Friday morning was looked forward to with considerable anticipation, as it combined a 60-mile ride over one of the interurban electric railroad lines for which this part of the country is famous, to Purdue University at Lafayette, Ind., and an inspection of the laboratories and buildings of the university. Arriving there the party was received by Prof. W. F. M. Goss, dean of the schools of engineering, and other representatives of the faculty, and was ushered to the Eliza Fowler Hall. Following a few words of welcome by the dean and a response by President Hutton, the society proceeded at once with the consideration of the additional papers on superheated steam that were scheduled for the

FIFTH SESSION.

The first paper,

"Experiences with Superheated Steam,"

by George H. Barrus, Boston, Mass., referred to those of the author at the Massachusetts Institute of Technology with a Corliss engine. (Experiments were made at different cutoffs, and with different degrees of superheating, the cylinder temperature being determined by a cylinder pyrometer); an independently fired superheater containing 120 sq. ft. of surface; a superheater attached to a return tubular boiler, supplying a single cylinder engine; various boilers of the vertical type furnishing superheated steam to engines; an independently fired superheater attached to a compound Wolff engine having 90 sq. ft. of surface; an independently fired superheater having 2640 sq. ft. of surface furnishing highly superheated steam; another independently fired superheater containing 1810 sq. ft. of surface, supplying a Corliss compound engine; and a combined water tube boiler and superheater, the latter having 595 sq. ft. of surface. These experiments, among other matters, give the results of tests showing either the quantity of coal required for a given amount of superheating, or the saving in coal, or in steam, produced by using the superheated steam for engine power.

A. H. Kreusi discussed this paper by emphasizing some of the points made in his previous discussions. He stated that by using superheated steam the steam consumption of a turbine is reduced about 1 per cent. for every 12 degrees of superheat, and that in general a moderate amount of superheat is relatively of greater value. As high as 250 degrees of superheat, he declared, is never desirable. For turbines of 1000-kw. size or smaller he does not advocate the use of any superheat. For turbines between 2000 and 3000 kw. he recommends 75 degrees of superheat at the turbine and 100 degrees at the boiler, roughly, and for larger turbines 100 degrees superheat at the turbine. The gain due to over 100 degrees is not likely to be sufficient to warrant its use. E. H. Foster differed and thought that small power plants are justified in using superheated steam, as the remarks made by the previous speaker applied to turbines only, and engines are also to be considered. He had found that the saving very seldom was less than 10 per cent. as reported by tests.

"The Use of Superheated Steam in an Injector,"

by S. L. Kneass, Philadelphia, Pa., was a paper which described the principle of action of the injector and the

essential feature of complete condensation of steam during the transfer of its momentum to the inflowing water are described. When operating with 180 lb. boiler pressure the combining tube is traversed in 0.008 sec., and any additional heat in the steam or water supply interferes with complete and instant condensation. The effect of superheated steam is to reduce the efficiency and even prevent the operation of an improperly designed injector. In almost all plants it is possible to use a special pipe to supply dry and saturated steam to the injector.

This paper passed without discussion, and the next,

"Superheated Steam on Locomotives,"

by H. H. Vaughan, Montreal, Canada, was read in abstract. It was a report on the progress so far obtained in the construction of superheaters on locomotives in the United States and Canada, and enumerated the various locomotives that have been equipped with superheaters, stating the design of superheater and type of locomotive on which it was applied. The table showed that practically all of these engines are on the Canadian Pacific Railway, the roads in the United States having so far only applied superheaters to 15 locomotives, while the Canadian Pacific, including those engines now on order, will have a total of 372 engines equipped with this device. The types of superheaters so far used, namely, Schmidt smoke box, Schmidt smoke tube, Cole field tube, Cole return bend and Vaughan-Horsey, were illustrated and described. Details as to the features of construction were given and economical results obtained in tests and in service on the Canadian Pacific, and such reports as have so far been obtained from roads in the States. The remainder of the paper discussed some of the troubles experienced, and the methods taken to overcome them, and concluded by stating that the use of superheaters on locomotives is on the whole satisfactory and that an increase in their number may be expected.

Max Toltz doubted Vaughan's results where he reported a coal saving of 15 to 18 per cent. and a steam saving of 23 to 27 per cent., because he believed that the data was not taken with sufficient accuracy. He made it clear, however, that he is an advocate and not an antagonist of superheaters. Continuing with reference to Barrus' paper, he answered Mr. Kreusl, and agreed with Mr. Foster that there is higher economy with superheat in small plants than in large ones. He insisted that turbine builders must design to use higher superheat.

"Analysis of Locomotive Tests,"

by Prof. S. A. Reeve, Worcester, Mass., gave a Hirn's analysis of the Pennsylvania Railroad's locomotive test conducted at St. Louis in 1904. The paper aimed to bring out three points in the showing made by the St. Louis tests of modern locomotives: The very high efficiency developed at light loads, together with the rapid decrease in efficiency as the load comes on; the marked loss in ultimate capacity for power from a given fire, or of capacity for handling heavy train loads, amounting to as much as 1000 hp., which is involved in designing the boiler so as to have its maximum efficiency occur under minimum load; and the complete lack of explanation of this loss in the tests, where upwards of 30 per cent. of the heat known to have been developed remains unaccounted for, under the heavier loads.

A written discussion from Prof. William Kent questioned the application of the Hirn's analysis to a boiler as it is only adapted to engine tests, and he had never known of a boiler test in which the waste heat was accounted for. Professor Goss discussed one phase of the paper, criticising the author for going outside of the data that was used by the society's Committee on Locomotive Tests at St. Louis. He also referred a little further to locomotive tests, and then presented his own paper,

"The Cole Locomotive Superheater,"

which referred to the performance of this superheater as applied to the Purdue University locomotive known as "Schenectady No. 3." This superheater has a total heating surface of 193 sq. ft., and is applied to a boiler which previously had been used in supplying saturated steam. To accommodate the superheater the evaporating surface was somewhat reduced, and as it now stands the

superheating surface is practically 20 per cent. of the evaporating surface. The superheat obtained ranges from 120 to 200 degrees, and is greatest when the power of the boiler is the highest. Before the superheater was applied the experimental locomotive consumed from 24 to 27 lb. of saturated steam per indicated horsepower per hour. It now consumes from 20 to 22 lb. of superheated steam per horsepower hour, the precise consumption in each case depending on the conditions of running. The author explained that this paper was merely intended to be preliminary to a more complete report.

It was remarked in a discussion from H. H. Vaughan, that the amount of superheat in tubes of different lengths as given by Professor Goss, was interesting, but that it would also have been of interest to have told what the location of the tubes was.

The allotted time having expired, it was decided to close the discussion at this point, requesting others who might care to discuss the papers to do so in writing.

The adoption of a motion of thanks and testimonial of appreciation to the local committee and all others who had had part in making the stay of the visitors enjoyable, concluded the session and formal adjournment was then taken.

Purdue University.

After a luncheon served in one of the university buildings, the visitors were divided into parties and conducted about the shops and laboratories and such other parts of the university as they wished to see. The following facts concerning Purdue are interesting: It was organized in 1862, and now enrolls 2046 students, of which 1300 are registered in engineering courses. It houses the official laboratories of the Master Car Builders' Association, and maintains a timber testing station in co-operation with the Bureau of Forestry of the United States Government. Purdue's locomotive testing laboratory and its collection of historic locomotives have a reputation of their own and formed two of the principal attractions, especially to those concerned with railroad and locomotive engineering. The university provides instruction in mechanical, civil and electrical engineering, agriculture, medicine, pharmacy, domestic economy, industrial art and general science. In consideration of the occasion the college daily, *The Purdue Exponent*, printed a supplement for distribution among the visitors, containing a historical sketch of the university's development and a descriptive account of it as it is to-day, the latter covering the buildings, shops, museums, laboratories, &c. A graphical comparison of the size of its engineering department and those of other institutions in this country shows it to rank third in number of students, Cornell being first, and the Massachusetts Institute of Technology second.

Registered Attendance.

The estimate given last week of the probable attendance at the meeting proved to be quite nearly correct. The final registration of members and guests was 289.

Investigations by the Department of Agriculture have demonstrated that alcohol can be produced from corn cobs in sufficient quantity to justify the erection of a distilling plant in connection with a corn cannery. By simple methods of fermentation a product of 11 gal. of alcohol has been obtained from 1 ton of green cobs, and similar methods have resulted in a product of 6 gal. from 1 ton of green corn stalks. The tests show that a ton of stalks contains about 240 lb. of fermentable substances, from which about 100 lb. of absolute alcohol and a total of 200 lb. of proof spirits should be produced. As a gallon of alcohol weighs a little under 7 lb., this points to an ultimate yield of 15 gal. per ton of green stalks.

Pickands, Mather & Co., Cleveland, Ohio, have commenced the erection of a large coal dock, 100 x 750 ft., at Sweet's point, near Detour, at the mouth of St. Mary's River. It will have ore pockets with 1000 tons or more capacity each, and will be equipped with two McMyler dumpers, each having a 1½-ton grab bucket. The equipment will permit the unloading of a 4000-ton boat in about 24 hr.

Trade Developments in Canada.

Bounties and Exports.

TORONTO, June 1, 1907.—Instructions have been issued to Canadian collectors of customs to watch exports of pig iron, puddled bars, steel ingots and rolled wire rods in order to separate these from the quantities of like iron and steel products that are eligible for bounty. Under the new law exportation is a bar to claims for bounty on these articles. If the collector is in doubt as to whether bounty has already been paid, or is to be claimed, he may withhold his permit for exportation until there is deposited with him a sum equal to the maximum amount of bounty otherwise due upon the articles, the deposit to be refunded when it is shown to the satisfaction of the collector that no bounty has been or will be obtained on the material. Previously exportation did not involve the forfeiture of the bounty, except in the case of wire rods. The bounty on these was always conditional upon their being used in Canadian wire works as the raw material of wire. Pig iron, puddled bar and crude steel were entitled to the bounties severally prescribed for them, no matter though they were exported. Some years ago the greater part of the output of the Dominion Iron & Steel Company was sold outside of Canada, the United States for a time taking the bulk of the company's raw steel. At that time, however, there were not the inducements at present existing for the converting of the steel into rolled products. There were no bounty on wire rods, no duty on steel rails and no great rush of railroad building in Canada.

Blast Furnaces.

Mackenzie & Mann have made application to the Mayor of Toronto for land in the vicinity of Ashbridge Bay as a site on which to construct a blast furnace. No particulars have been given as to the plans, but it is understood that these are on a scale great enough to call for several hundred acres.

Hugh Sutherland, general manager of the Atikokan Iron Company, stated a short time ago that he expected the company's furnace to begin operations next week. By that time, he thought, the ore deliveries would be sufficient to warrant the starting of the plant.

As the Dominion Iron & Steel Company found it necessary to add to its steel making plant in order to bring up its raw material supply to the capacity of its rail mills, so the Algoma Steel Company finds it necessary to add to its pig iron plant in order to keep its rail mill fully occupied. It has decided to erect a new blast furnace, which, according to a statement credited to Superintendent Lewis, is to be the largest in Canada. This course is deemed preferable to the importing of pig iron from the United States at possibly high prices.

Another addition to its works which the Algoma Steel Company contemplates is a coke plant. This will be a consequence of the Dominion Government's action in removing the duty on bituminous coal imported for the purpose of manufacturing coke.

The Electrical Smelting of Iron.

The plant for the electrical smelting of iron, of whose construction in Welland mention has been made in this correspondence, is to be used as a demonstration plant, and it is the intention of the projectors to use pyrite cinders as the raw material. These cinders are the refuse of sulphuric acid manufactories, and have, so far, on account of the large amount of sulphur still left in them, been utterly useless. The plant is to be of 3000 hp., and capable of producing 40 tons of pig iron per 24-hr. day.

The Vancouver World says that N. Thompson of that city, who has in hand a project for the establishing in British Columbia of a plant for the electrical smelting of iron, is expected to return about July 1 from Europe, where he is making arrangements with parties who are to be associated with him in the enterprise.

Big Demand for Steel.

The building of new railroad lines, though much retarded by the long and severe winter and by the lack of labor, still proceeds at a faster rate than the rail mills

of the country can keep up with. Since the opening of navigation rails have been sent forward, both to the Quebec sections under construction and to the new lines in the West. The long ice blockade at Fort William and Port Arthur gave the mills more time, but unless track laying is kept down to a much smaller mileage than the railroad builders had laid out for this season there will have to be some importing of rails.

The Canadian Northern Railway Company proposes to expend a considerable sum upon the Booth dock at Port Arthur in order to make it suitable for handling the rail traffic.

As an indication of the scarcity of steel in Canada it may be mentioned that advertisements in Canadian papers for tenders for the steelwork in the Lansdowne Subway, Toronto, elicited not a single reply. The city engineer is now advertising in British papers.

Metallurgical Works.

On May 28 the ratepayers of Kingston, Ont., carried two by-laws granting tax exemption for 10 years and free sites to smelters. One of the smelters, which is to be built and operated by the Grey & Hadley Company, will work upon zinc ores. This is to cost \$100,000. The other smelter, which the Stanley Lead Company is to construct and operate, will turn out pig lead. Its plant is to cost not less than \$40,000. The by-laws were carried by an almost unanimous vote. The agreements require the companies to begin building their works two weeks after the passage of the by-laws, and to have them completed in October. The two companies' buildings must be worth not less than \$50,000, and they are expected to employ 100 hands. They will bring their ore from mines in North Frontenac. Each has a 5-acre site.

It is announced that a large concentrating plant will be built at Sault Ste. Marie, Ont., for the treating of copper ores from the Superior mine. The name of the concern is to be the Superior Copper Company, and its capital \$2,000,000. The plant is to have a capacity of 400 tons per day. Ex-Mayor Frank Parry of the Michigan Sault is one of the persons named in connection with the undertaking.

Sundry Industrial Developments.

Arthur E. Crockett of the Standard Chain Company, Pittsburgh, was in Welland about a week ago looking at a site which it is proposed to donate to that company for the building of a Canadian branch. The Town Council of Welland met May 27 and passed a resolution in favor of submitting a by-law to fix the company's assessment for 10 years at \$3000 and to furnish 3000 gal. of water a day. The company had already come to terms with Walkerville for the planting of its Canadian branch there, but had the privilege of withdrawing. It remains to be seen which of the places will be finally settled upon.

J. F. Smith, president of the Phoenix Iron Works, Seattle, proposes to build general foundry and machine shop works in Vancouver at a cost of \$200,000. Land has been leased from the Canadian Pacific Railway Company for the purpose.

C. A. C. J.

Railroad Repair Shops.—One of the heaviest items of expense incident to the operation of steam railroads during the past few years has been the construction and extension of repair shops. Some of the large roads now have many millions of dollars invested in such shops for the repairs of locomotives alone. Electric lines have not found it necessary to maintain such elaborate repair equipments, although they are becoming more inclined to make their own repairs. The Interborough Rapid Transit Company of New York has a small shop, employing about 50 men, and containing a few machine tools, all of light capacity. In this shop are made all the repairs to an equipment of 430 motor cars, each fitted with two 200-hp. motors, or a total equipment of 860 motors of an aggregate of 172,000 hp. On 13 of the largest steam roads the average cost per locomotive for maintenance for some years has been \$2212 per annum, a total of over 7000 locomotives being included in the return. For nearly 8000 motor cars this cost was only \$107 per car. If it takes four motor cars to equal in power one locomotive, the corresponding figure would be \$428.

The Production of Coal in 1906.

According to statistics compiled for the United States Geological Survey by Edward W. Parker, the total production of coal in the United States in 1906 was 414,039,581 tons of 2000 lb., valued at \$512,610,744. These figures, compared with those of the preceding year, when the output amounted to 392,919,341 tons, valued at \$476,756,963, show an increase of 21,120,240 tons, or 5.4 per cent., in quantity, and of \$35,853,781, or 7.5 per cent. in value. The figures for the several States are as follows:

Production of Coal in 1906, by States.

State.	Net tons.	Value.
Alabama	13,107,663	\$17,467,886
Arkansas	1,864,518	2,999,774
California and Alaska	30,831	78,084
Colorado	10,114,074	12,738,509
Georgia and North Carolina	363,463	407,247
Idaho and Nevada	6,165	24,238
Illinois	41,497,435	44,742,440
Indiana	12,084,281	13,105,168
Indian Territory	2,859,450	5,481,053
Iowa	7,321,639	11,688,598
Kansas	6,010,858	8,935,195
Kentucky	9,673,536	9,794,823
Maryland	5,434,528	6,473,829
Michigan	1,336,338	2,402,529
Missouri	3,755,778	6,163,449
Montana	1,787,934	3,186,620
New Mexico	1,963,558	2,635,571
North Dakota	300,998	437,894
Ohio	27,729,843	30,386,297
Oregon	79,731	212,338
Pennsylvania:		
Anthracite	71,282,411	131,917,694
Bituminous	129,263,673	130,265,241
Tennessee	6,262,686	7,682,121
Texas	1,160,707	2,058,731
Utah	1,773,847	2,411,992
Virginia	4,275,815	4,207,521
Washington	3,276,184	5,908,434
West Virginia	43,276,485	40,777,382
Wyoming	6,138,152	8,019,486
Totals	414,039,581	\$512,610,744

Of the total production in 1906, Pennsylvania contributed 200,546,084 net tons, or 48.4 per cent. Its anthracite production was 63,645,010 gross tons (or 71,282,411 net tons), valued at \$131,917,694, while the bituminous production was 129,263,673 net tons, valued at \$130,265,241. The anthracite production of Pennsylvania in 1906 was 5,694,142 gross tons (or 6,377,439 net tons) less than that of 1905, with a decrease in value of \$9,961,306, while the bituminous production showed an increase of 10,850,036 net tons in quantity and of \$16,874,734 in value.

One of the interesting facts presented in the statistics of coal production last year is that West Virginia has supplanted Illinois as the second coal producing State, West Virginia showing a total output of 43,276,485 net tons, while the production of Illinois was 41,497,435 tons. This was due principally to the almost complete suspension of mining in Illinois (as in other States where labor union forces were strong) during all of April and a part of May, when the miners and operators were in conflict over the wage scale, whereas the majority of the operations in West Virginia were more actively worked, as a result of the suspension of work in the other districts.

Notwithstanding, however, the loss of from six to eight weeks in the States where mining operations were suspended, there was a general increase in production east of the Mississippi River, the only exceptions noted being in Michigan, Georgia and North Carolina. In Illinois, where the question of the wage scale is most sharply contested, the production increased from a total of 38,434,363 net tons in 1905 to 41,497,435 tons in 1906. Indiana's production of coal increased from 11,895,252 net tons in 1905 to 12,084,281 tons the following year. Ohio's production increased from 25,552,950 net tons in 1905 to 27,729,843 tons in 1906.

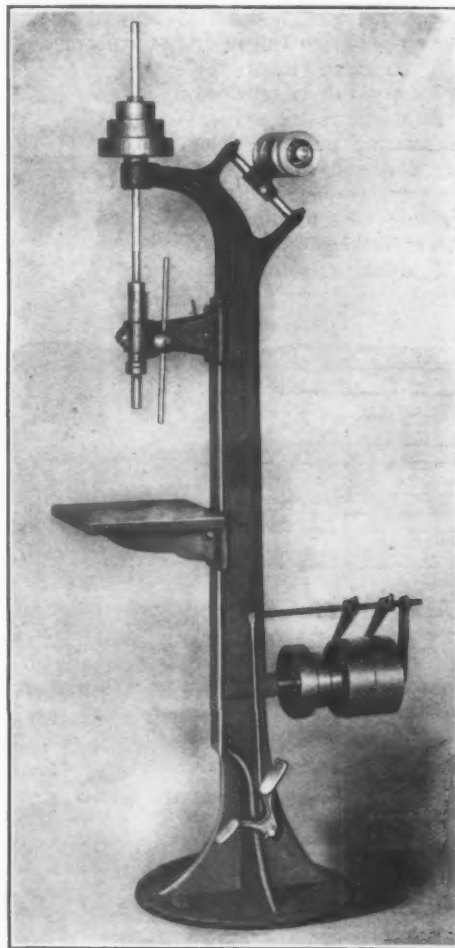
In West Virginia, where there was no suspension of mining, the output of coal increased from 37,791,580 net tons in 1905 to 43,276,485 tons in 1906.

The Ontario Iron & Steel Company, Toronto, Ont., whose new plant at Welland, Ont., is about completed,

will be producing open hearth steel ingots this month. By July 1 the company expects to be making steel castings, and to be rolling billets by July 15. About August 1 the company will be producing merchant bar iron.

The New Reed Single Spindle Drill.

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A 14-In. Single Spindle Sensitive Drill Made by the Francis Reed Company, Worcester, Mass.

ping or starting the spindle, an especially desirable attachment when both hands are occupied in holding the work. The spindle has a ball bearing thrust collar. The head and table are adjustable on the same slide, which permits a wide range of usefulness. The machine is capable of drilling holes up to $\frac{1}{2}$ in., and its total weight is 250 lb.

Some investigators have found it feasible to use alcohol in internal combustion engines by admitting it in liquid form just over a disk valve, the liquid passing to the cylinder through a series of brass screens. With this method of admission standard gasoline engines are said to start easily and to run freely and without smoke or odor. Attempts to use any form of carburetor, in which the vapor of the alcohol is to be taken up by the air entering the cylinder, do not seem to have proved successful, without some means of forcing vaporization, such as heating or atomizing.

Trade Developments in Canada.

Bounties and Exports.

TORONTO, June 1, 1907.—Instructions have been issued to Canadian collectors of customs to watch exports of pig iron, puddled bars, steel ingots and rolled wire rods in order to separate these from the quantities of like iron and steel products that are eligible for bounty. Under the new law exportation is a bar to claims for bounty on these articles. If the collector is in doubt as to whether bounty has already been paid, or is to be claimed, he may withhold his permit for exportation until there is deposited with him a sum equal to the maximum amount of bounty otherwise due upon the articles, the deposit to be refunded when it is shown to the satisfaction of the collector that no bounty has been or will be obtained on the material. Previously exportation did not involve the forfeiture of the bounty, except in the case of wire rods. The bounty on these was always conditional upon their being used in Canadian wire works as the raw material of wire. Pig iron, puddled bar and crude steel were entitled to the bounties severally prescribed for them, no matter though they were exported. Some years ago the greater part of the output of the Dominion Iron & Steel Company was sold outside of Canada, the United States for a time taking the bulk of the company's raw steel. At that time, however, there were not the inducements at present existing for the converting of the steel into rolled products. There were no bounty on wire rods, no duty on steel rails and no great rush of railroad building in Canada.

Blast Furnaces.

Mackenzie & Mann have made application to the Mayor of Toronto for land in the vicinity of Ashbridge Bay as a site on which to construct a blast furnace. No particulars have been given as to the plans, but it is understood that these are on a scale great enough to call for several hundred acres.

Hugh Sutherland, general manager of the Atikokan Iron Company, stated a short time ago that he expected the company's furnace to begin operations next week. By that time, he thought, the ore deliveries would be sufficient to warrant the starting of the plant.

As the Dominion Iron & Steel Company found it necessary to add to its steel making plant in order to bring up its raw material supply to the capacity of its rail mills, so the Algoma Steel Company finds it necessary to add to its pig iron plant in order to keep its rail mill fully occupied. It has decided to erect a new blast furnace, which, according to a statement credited to Superintendent Lewis, is to be the largest in Canada. This course is deemed preferable to the importing of pig iron from the United States at possibly high prices.

Another addition to its works which the Algoma Steel Company contemplates is a coke plant. This will be a consequence of the Dominion Government's action in removing the duty on bituminous coal imported for the purpose of manufacturing coke.

The Electrical Smelting of Iron.

The plant for the electrical smelting of iron, of whose construction in Welland mention has been made in this correspondence, is to be used as a demonstration plant, and it is the intention of the projectors to use pyrite cinders as the raw material. These cinders are the refuse of sulphuric acid manufactories, and have, so far, on account of the large amount of sulphur still left in them, been utterly useless. The plant is to be of 3000 hp., and capable of producing 40 tons of pig iron per 24-hr. day.

The Vancouver *World* says that N. Thompson of that city, who has in hand a project for the establishing in British Columbia of a plant for the electrical smelting of iron, is expected to return about July 1 from Europe, where he is making arrangements with parties who are to be associated with him in the enterprise.

Big Demand for Steel.

The building of new railroad lines, though much retarded by the long and severe winter and by the lack of labor, still proceeds at a faster rate than the rail mills

of the country can keep up with. Since the opening of navigation rails have been sent forward, both to the Quebec sections under construction and to the new lines in the West. The long ice blockade at Fort William and Port Arthur gave the mills more time, but unless track laying is kept down to a much smaller mileage than the railroad builders had laid out for this season there will have to be some importing of rails.

The Canadian Northern Railway Company proposes to expend a considerable sum upon the Booth dock at Port Arthur in order to make it suitable for handling the rail traffic.

As an indication of the scarcity of steel in Canada it may be mentioned that advertisements in Canadian papers for tenders for the steelwork in the Lansdowne Subway, Toronto, elicited not a single reply. The city engineer is now advertising in British papers.

Metallurgical Works.

On May 28 the ratepayers of Kingston, Ont., carried two by-laws granting tax exemption for 10 years and free sites to smelters. One of the smelters, which is to be built and operated by the Grey & Hadley Company, will work upon zinc ores. This is to cost \$100,000. The other smelter, which the Stanley Lead Company is to construct and operate, will turn out pig lead. Its plant is to cost not less than \$40,000. The by-laws were carried by an almost unanimous vote. The agreements require the companies to begin building their works two weeks after the passage of the by-laws, and to have them completed in October. The two companies' buildings must be worth not less than \$50,000, and they are expected to employ 100 hands. They will bring their ore from mines in North Frontenac. Each has a 5-acre site.

It is announced that a large concentrating plant will be built at Sault Ste. Marie, Ont., for the treating of copper ores from the Superior mine. The name of the concern is to be the Superior Copper Company, and its capital \$2,000,000. The plant is to have a capacity of 400 tons per day. Ex-Mayor Frank Parry of the Michigan Sault is one of the persons named in connection with the undertaking.

Sundry Industrial Developments.

Arthur E. Crockett of the Standard Chain Company, Pittsburgh, was in Welland about a week ago looking at a site which it is proposed to donate to that company for the building of a Canadian branch. The Town Council of Welland met May 27 and passed a resolution in favor of submitting a by-law to fix the company's assessment for 10 years at \$3000 and to furnish 3000 gal. of water a day. The company had already come to terms with Walkerville for the planting of its Canadian branch there, but had the privilege of withdrawing. It remains to be seen which of the places will be finally settled upon.

J. F. Smith, president of the Phoenix Iron Works, Seattle, proposes to build general foundry and machine shop works in Vancouver at a cost of \$200,000. Land has been leased from the Canadian Pacific Railway Company for the purpose.

C. A. C. J.

Railroad Repair Shops.—One of the heaviest items of expense incident to the operation of steam railroads during the past few years has been the construction and extension of repair shops. Some of the large roads now have many millions of dollars invested in such shops for the repairs of locomotives alone. Electric lines have not found it necessary to maintain such elaborate repair equipments, although they are becoming more inclined to make their own repairs. The Interborough Rapid Transit Company of New York has a small shop, employing about 50 men, and containing a few machine tools, all of light capacity. In this shop are made all the repairs to an equipment of 430 motor cars, each fitted with two 200-hp. motors, or a total equipment of 860 motors of an aggregate of 172,000 hp. On 13 of the largest steam roads the average cost per locomotive for maintenance for some years has been \$2212 per annum, a total of over 7000 locomotives being included in the return. For nearly 8000 motor cars this cost was only \$107 per car. If it takes four motor cars to equal in power one locomotive, the corresponding figure would be \$428.

The Production of Coal in 1906.

According to statistics compiled for the United States Geological Survey by Edward W. Parker, the total production of coal in the United States in 1906 was 414,039,581 tons of 2000 lb., valued at \$512,610,744. These figures, compared with those of the preceding year, when the output amounted to 392,919,341 tons, valued at \$476,756,963, show an increase of 21,120,240 tons, or 5.4 per cent., in quantity, and of \$35,853,781, or 7.5 per cent. in value. The figures for the several States are as follows:

Production of Coal in 1906, by States.

State.	Net tons.	Value.
Alabama	13,107,663	\$17,467,886
Arkansas	1,864,518	2,999,774
California and Alaska	30,831	78,684
Colorado	10,114,074	12,738,509
Georgia and North Carolina	363,463	407,247
Idaho and Nevada	6,165	24,238
Illinois	41,497,435	44,742,440
Indiana	12,084,281	13,105,168
Indian Territory	2,859,450	5,481,053
Iowa	7,321,639	11,688,598
Kansas	6,010,858	8,935,195
Kentucky	9,673,536	9,794,823
Maryland	5,434,528	6,473,829
Michigan	1,336,338	2,402,529
Missouri	3,755,778	6,163,449
Montana	1,787,934	3,186,620
New Mexico	1,963,558	2,635,571
North Dakota	300,998	437,894
Ohio	27,729,843	30,386,297
Oregon	79,731	212,338
Pennsylvania:		
Anthracite	71,282,411	131,917,694
Bituminous	129,263,673	130,265,241
Tennessee	6,262,686	7,682,121
Texas	1,160,707	2,058,731
Utah	1,773,847	2,411,992
Virginia	4,275,815	4,207,521
Washington	3,276,184	5,908,434
West Virginia	43,276,485	40,777,382
Wyoming	6,138,152	8,019,486
Totals	414,039,581	\$512,610,744

Of the total production in 1906, Pennsylvania contributed 200,546,084 net tons, or 48.4 per cent. Its anthracite production was 63,645,010 gross tons (or 71,282,411 net tons), valued at \$131,917,694, while the bituminous production was 129,263,673 net tons, valued at \$130,265,241. The anthracite production of Pennsylvania in 1906 was 5,694,142 gross tons (or 6,377,439 net tons) less than that of 1905, with a decrease in value of \$9,961,306, while the bituminous production showed an increase of 10,850,036 net tons in quantity and of \$16,874,734 in value.

One of the interesting facts presented in the statistics of coal production last year is that West Virginia has supplanted Illinois as the second coal producing State, West Virginia showing a total output of 43,276,485 net tons, while the production of Illinois was 41,497,435 tons. This was due principally to the almost complete suspension of mining in Illinois (as in other States where labor union forces were strong) during all of April and a part of May, when the miners and operators were in conflict over the wage scale, whereas the majority of the operations in West Virginia were more actively worked, as a result of the suspension of work in the other districts.

Notwithstanding, however, the loss of from six to eight weeks in the States where mining operations were suspended, there was a general increase in production east of the Mississippi River, the only exceptions noted being in Michigan, Georgia and North Carolina. In Illinois, where the question of the wage scale is most sharply contested, the production increased from a total of 38,434,363 net tons in 1905 to 41,497,435 tons in 1906. Indiana's production of coal increased from 11,895,252 net tons in 1905 to 12,084,281 tons the following year. Ohio's production increased from 25,552,950 net tons in 1905 to 27,729,843 tons in 1906.

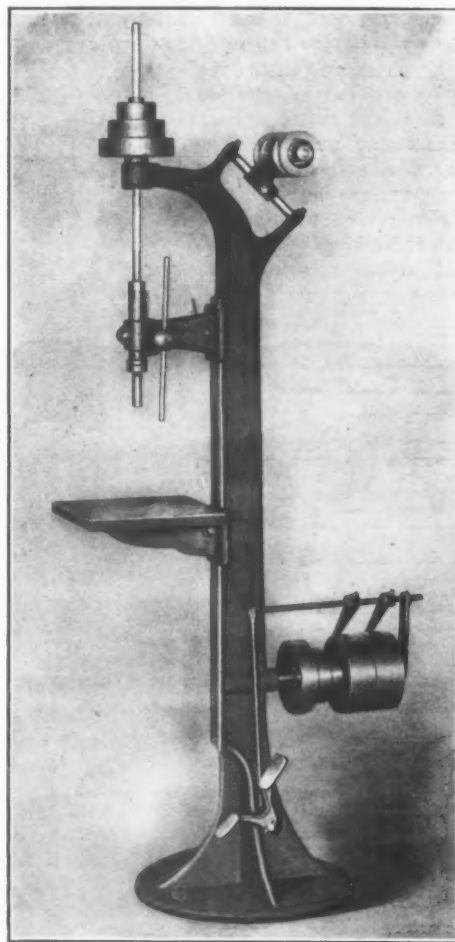
In West Virginia, where there was no suspension of mining, the output of coal increased from 37,791,580 net tons in 1905 to 43,276,485 tons in 1906.

The Ontario Iron & Steel Company, Toronto, Ont., whose new plant at Welland, Ont., is about completed,

will be producing open hearth steel ingots this month. By July 1 the company expects to be making steel castings, and to be rolling billets by July 15. About August 1 the company will be producing merchant bar iron.

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The feature of the new 14-in. single spindle sensitive drill recently brought out by the Francis Reed Company, Worcester, Mass., and shown in the illustration, is the idler adjustment which permits three spindle speeds from cone pulleys. The slide of the idler bracket has three holes, to take the pull pin, which holds the idler in the necessary position. It is an easy matter to change the idler from one position to another in changing the belt to a different speed. Another feature of the machine is the foot slipper, for the convenience of the operator in stop-



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ping or starting the spindle, an especially desirable attachment when both hands are occupied in holding the work. The spindle has a ball bearing thrust collar. The head and table are adjustable on the same slide, which permits a wide range of usefulness. The machine is capable of drilling holes up to $\frac{1}{2}$ in., and its total weight is 250 lb.

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Making Seamless Steel Bathtubs by Toggle Press Method.

Equipment for the Pressed Steel Sanitary Company, Detroit.

An equipment of presses and dies for producing seamless stamped steel bathtubs has been designed and built by the Toledo Machine & Tool Company, Toledo, Ohio, for the Pressed Steel Sanitary Company, Detroit, Mich. Aside from the fact that the plant represents the development of a second manufacturing industry for making bathtubs out of sheet steel, interest lies in it in the fact that the stampings are probably the largest in deep stamped work yet produced in this country by the toggle press method. Another feature is that the shell or stamping is produced cold in three operations, Fig. 1. The stamping is annealed but once during the process, and this annealing is required, it is stated, only to restore ductility to the rim of the tub in order to prevent the possibility of fracture when the finally formed tub is trimmed in the third and last operation of the forming process. The drawing dies and attachments for this work are designed also to prevent the forming of wrinkles or buckles in the sheet, so that spinning or ironing

The base or anvil of the machine is made in three sections, the combined weight of which is about 90,000 lb. The main arch and cylinder and the two housings or uprights are securely bolted together on the base or anvil and reinforced by four large steel rods or shafts passing entirely through the base housings and arch and shrunk in position.

The dies used for drawing the tub consist of a female die made adjustable for three sizes or lengths, a male die or forming punch for each size, which is keyed to the cross head or ram, and a pressure plate for each size, which is securely bolted to the blank holder. The special design or shape and construction of dies are to prevent the buckling or wrinkling of sheet.

The actual time required to draw the tub in either the first or second operation is less than 40 sec. after the blank has been placed in position. About the same length of time is required to place the blank or sheet in position and remove the tub or stamping from the dies when finished. The lower die is fitted with an automatic knock-out, operated from the blank holder for ejecting the stamping from the dies when completed.

The operation of producing the stamping consists in the first place of placing a plain squared sheet or plate of steel, $\frac{1}{4}$ -in. thick, in position in the die, when the operator then brings the small cylinder into



Fig. 1.—The Three Stages in Forming the Bathtub.

processes are unnecessary, and this result, as shown by accompanying illustrations, has been accomplished. The entire time required to complete the three operations in making the deep stamping is found to be not more than 3 min. The Toledo Machine & Tool Company regards the equipment as marking the successful completion of the largest set of machinery for producing seamless steel stamped work without the use of hydraulics.

The machine or hammer shown in the illustration, Fig. 3, while large, is of much less weight because of its special construction than would be required, the company says, in the other form of toggle drawing presses now in use for smaller work of a similar nature. The new design of machine is fitted with two steam cylinders distinctly separate in their functions.

The smaller of the two cylinders, which is located on the right-hand side of the machine, operates and controls the blank holder. The blank holder has a vertical movement of 19 in. and is controlled by a toggle at each of the four corners, the combined pressure of which is estimated to be approximately 1400 tons. Two of these toggles are attached to each of two horizontal shafts running right to left on the front and rear side of the machine. These shafts are connected outside of housings on the right-hand side of the machine by means of powerful bell cranks and links to the piston shaft of the small cylinder previously referred to. The blank holder is elevated or lowered and securely locked at will of the operator independently of other movements of the machine.

The main cylinder for operating the forming plunger is 28 in. in diameter and of sufficient length to give the plunger a stroke of 50 in. This piston shaft is attached to a steel cross head or ram weighing about 6000 lb., and this, with the male forming die which is keyed to the cross head or ram, gives a falling weight of about 20,000 lb.

operation, causing the blank holder and pressure plate to bear on the sheet when the blank holder remains at rest and is automatically located with the required pressure on the sheet to prevent its wrinkling or buckling. The operator next brings the larger cylinder into operation, forcing the forming plunger upon the sheet and forming the stamping to a depth of about $12\frac{1}{2}$ in., which completes the first operation on the stamping, as shown in one of the half-tones, Fig. 1. The stamping is then lifted from the die, all of which has required not to exceed $1\frac{1}{2}$ min.

The stamping is next annealed and pickled to remove the scale. It is then again placed in position in the dies (the first operation dies having been previously removed and the dies for the second operation placed in the machine in the proper position), and the same operation of blank holder, pressure plate and forming plunger repeated, finishing the forming of the stamping to a depth of $17\frac{1}{2}$ in., 24 in. wide and 60 in. long, as shown in another of the half-tones, Fig. 1. Less time is required for the second operation than for the first.

Some of the sizes of the large press are as follows: Width between housings, 96 in.; bed area 96-in. right to left, 60 in. front to back; height from bottom of base or bed to extreme top of cylinder or arch, 23 ft.; total weight of machine, as specified, 260,000 lb.

The stampings are now ready for the trimming press, to which they are taken, where the flange is trimmed and the curved rim formed, the two operations being complete at one stroke of the press. This press, Fig. 4, is of special design, known as the Toledo 84-in. No. 96 double geared special. It is fitted with special die holder or fixture with swinging open front, Fig. 2. The lower trimming and forming dies are fitted to this fixture. The open front in the die or fixture comes together in the center and is securely locked after the stamping has been placed in position. The stamping is then trimmed and the curved edge of rim formed as previously stated at one

stroke, forming the completed tub. The dies are unlocked and swung open, when the stamping is quickly removed. The slide of this press is fitted with positive automatic knock out passing down through the upper die. As the slide lifts upward with the stroke of the press this knock out is brought into action stripping or forcing the work out of the upper die.

The bed and special fixtures of the press are fitted

Some of the sizes of this press are as follows: Stroke or slide motion, 6 in.; width between uprights, 86 in.; bed area 84 in. right to left, 48 in. front to back; distance bed to slide stroke and adjustment up, 36 in.; adjustment of slide, 4 in. This press is fitted with machine cut gears and with three engagement clutch with gravity releasing device; total weight of machine about 85,000 lb.

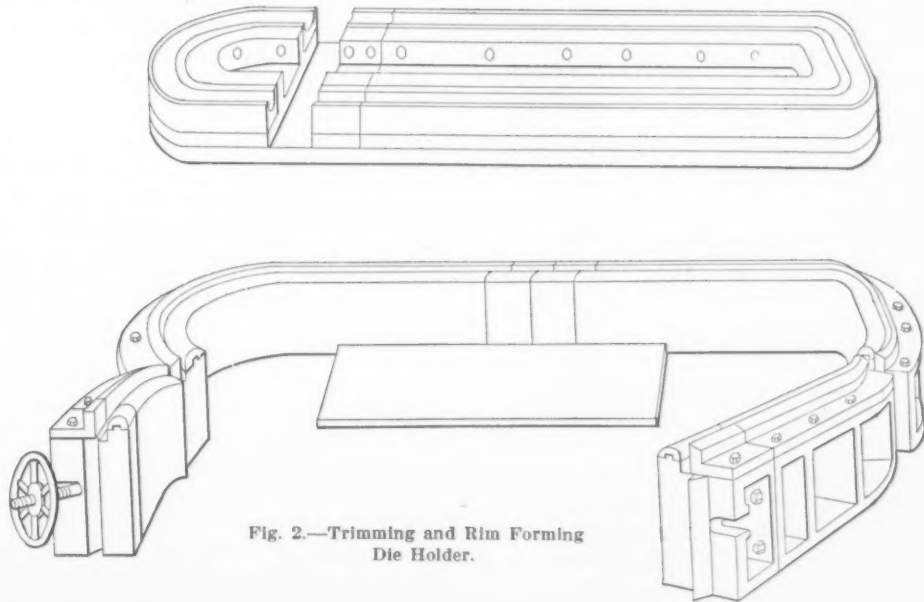


Fig. 2.—Trimming and Rim Forming Die Holder.

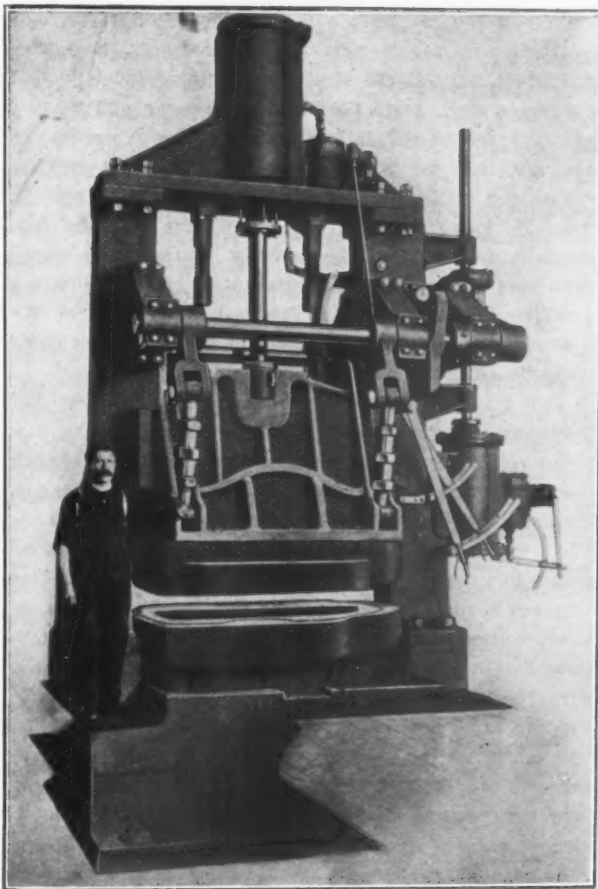


Fig. 3.—Steam Actuated Toggle Bathtub Stamping Hammer.

with lower cam actuated automatic knock out, which is timed to raise with the slide. This knock out is operated by the cam on the left end of crank shaft. The knock out receives the work as it is ejected from the upper dies and prevents the stamping falling back into the lower die. The time required for trimming and forming the rims is less than $1\frac{1}{4}$ min. per tub. This equipment has actually trimmed and formed the rims of tubs at the rate of 48 tubs per hour.

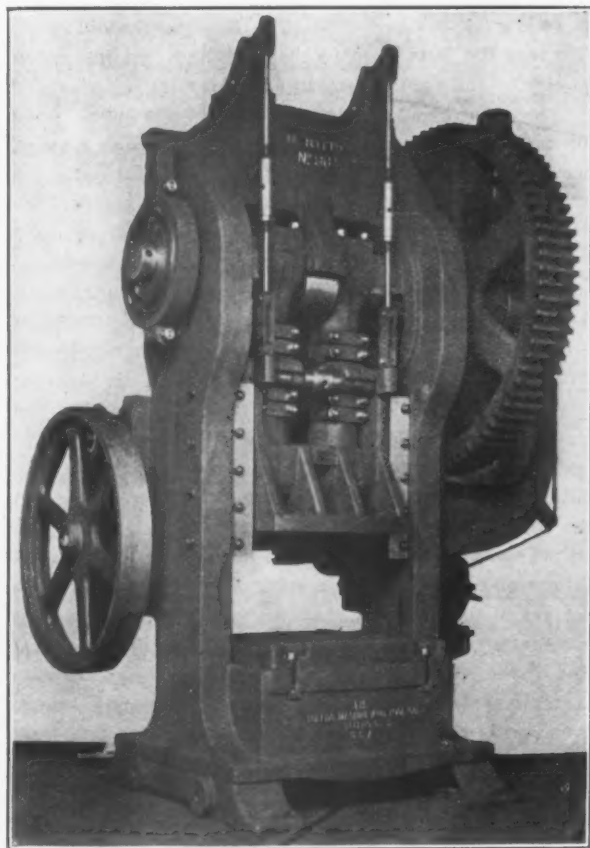


Fig. 4.—Rim Forming and Flange Trimming Press.

Other special presses of the more ordinary smaller types are provided in the equipment for punching holes for the supply and overflow pipes to the bath.

Cement for fastening iron to marble may be made of 30 parts of plaster of paris, 10 parts of iron filings and 1 part of sal ammoniac, mixed with vinegar to a fluid state. As the mixture hardens quickly, it must be prepared for immediate use.

THE IRON AGE

1855-1907.

New York, Thursday, June 6, 1907.

Entered at the New York Post Office, as Second Class Mail Matter.

DAVID WILLIAMS COMPANY,	.	.	.	.	.	.	.	.	.	PUBLISHER
CHARLES KIRCHHOFF,	.	.	.	.	.	.	.	.	.	} EDITORS
GEO. W. COPE,	.	.	.	.	.	.	.	.	.
A. I. FINDLEY,	.	.	.	.	.	.	.	.	.
RICHARD R. WILLIAMS,	.	.	.	.	.	.	.	.	.	HARDWARE EDITOR

Increasing the Cost of Steel Rails.

One deduction may fairly be made from the discussion on steel rails. That is, that the cost of manufacturing steel rails, assuming that the cost of raw material remains the same, will be greater under the next set of specifications generally adopted by the railroads than it is to-day. Out of the mass of comment that has been printed in the past two months, the measures for bringing the quality of steel rails up to the level demanded by present service, as suggested by those at all competent to speak on the subject, have come down in substance to two—more time and more steel. By the latter we do not refer now to larger rail section, but to an increase in the tonnage of ingots required for a ton of rails. The call for more time has come in the shape of suggestions that rolling mill operations be slower paced, even to the point of rolling blooms and reheating these in the old way; also that the tests be more thorough and that inspection be slower and result in more rejections.

The absurd and reckless statements put out in some discussions, evidently intended to be taken as serious, need not be further characterized. Certainly the engineers and managers of the railroads neither seek nor welcome help from such sources in the effort to work out the present problem. The charge that the steel companies have knowingly manufactured inferior rails—that is, rails known to depart from accepted specifications—is not fathered by the railroads. But the representatives of the railroads, as is well known, do ask for larger discards from ingots and they do urge that the manipulation of the metal in the mill is now so rapid and the finishing is at such high temperatures that the structure of heavy section rails is often too coarse and the work put upon them is insufficient to give the required resistance to compression and shock. The specifications of the Pennsylvania Railroad for 1908, which are not yet in the hands of the steel manufacturers, but are substantially determined upon, illustrate the concentration of the additional requirements of the railroads upon larger cropping and slower working. The main change proposed is the cropping of the top of the ingot at least 25 per cent., to insure rails free from piping or excessive segregation. The drop test will also be required, with added care in straightening, and the reduction to a minimum of gagging under the cold press. It is understood that the proposal is also considered by the engineers of the company of establishing a definite relation between the section of the rail bloom and of the rail, so as to give more and slower work in the rolls. This latter requirement has such a bearing, however, upon the question of rail section and the equalization of the amounts of metal in the head and base, respectively, that it is not likely to be enforced until a new section is adopted.

It need scarcely be said that had the rail mills of the country been working in the past two years under

such a specification as is indicated in the changes above outlined the output of rails in the United States would have been easily 20 to 25 per cent. less than it was. If these changes should now be agreed upon it would mean that the rail making capacity of the country must be much increased if such a demand is to be met as has come from the railroads since 1904. To return one-fourth of each ingot to the melting furnace, in addition to all the shearing of blooms and the scrap made later means a sharp reduction in the output of rail mills and necessarily an advance in the cost of manufacture. From four rails to the ingot there will be a drop to three rails, and in some cases to two full-lengths and one short rail from an ingot, a condition that presents no small problem unless a considerable reduction is to be counted upon in the rail requirements of the railroads. The increased rejections which will result from the enforcement of the drop test and the narrowing of the permissible original camber of rails accepted after straightening contribute further to the enhancement of cost.

It has been said frequently in the recent discussion, as though coming from railroad officials, that the question of price was not so much at issue as the getting of rails insuring a substantial reduction in the percentage of breakages in service. Indeed, nickel steel rails, costing nearly three times as much as carbon steel rails, though having more than three times the life of an ordinary rail, have been favored for curves and other places of particularly severe service. It remains to be seen, however, how the railroads will meet the practical outcome of their new requirements—in other words, how they will meet the bill the steel manufacturer must present for more steel, more time and more wear and tear of plant to the ton of rails produced. The experience of the cast iron car wheel manufacturers is not entirely reassuring on this point. They have been beset year by year for lower prices, at the same time that the railroads have increased the severity of tests and added each year to the service requirements. The cases are not exactly parallel, perhaps. The rail manufacturers, for a number of reasons, are not yet in the position of being compelled to make bricks without straw.

But leaving out the question of increased cost and assuming that the mills attempt to conform to the proposed requirements, and that the railroads pay enough more for rails to compensate for the added demands, there will still be a large winter crop of rail breakages. The vice-president of a railroad recently wrote in response to a request for testimony concerning broken rails: "On our road we are not having any trouble because we have stopped at a 45,000-lb. axle load and a moderate speed." Given the conditions that prevailed last winter, with the same high speeds, the same density of traffic and the same deficiencies in rolling stock, and the combination of all the so-called remedies the steel works are asked to provide will not prevent rail breakages in numbers sufficient to excite comment. The causes are so various and the responsibility so distributed that the results of such changes in specifications as are proposed are likely to be disappointing.

A Piece Price for Castings.

In the general discussion of the relations of foundry and machine shop, which was touched upon in *The Iron Age* of last week in connection with the responsibilities of the foundry, the question has arisen if it would not be a better practice for the foundry to sell its products at a piece price rather than by the pound. This method

exists already to a limited extent. It is argued that its general adoption would have a remedial influence upon the relations of the two trades. But foundrymen have various reasons for opposing so radical a change, while they agree that theoretically the piece system would have advantages. In practice they maintain that the change must be a very gradual one.

The jobbing foundry in its relations with customers such as machine tool builders, who have a wide variety of work, usually strikes an average price per pound of castings. The foundryman does not tell the machine shop that one casting will cost 4 cents and another 25 cents and yet another 40 cents a pound. The shop would not put up with such a schedule, because custom has fixed a uniform and apparently lower price, the foundryman asserts. So he finds a price which will give a fair profit on the total of a variety of work. A lack of facilities for determining exact cost, or making exact estimates, is another factor in this custom, but its chief reason is the preference of the average customer for a general price covering all or most of his foundry work, a preference largely due to the fact that he has always done the business that way. The individual who wishes a few small castings of somewhat complicated form will pay much more per pound than the machine tool builder who has a long list of patterns in more or less constant use. The latter pays for a gear case of small weight and expensive molding the same price that he pays for a lathe bed, while the transient customer, or he who has this class of work only, must pay considerably more.

On the other hand, the customer who wants heavy castings only can usually get a better price for them than the shop with a wider range of work. If a manufacturer buying miscellaneous castings could get a statement giving a correct price for each, based upon their actual cost to the foundry, he would find certain pieces higher than he has been paying and other pieces lower, with the total differing little from that of the bill prepared on the one price per pound basis.

The great objection to the piece system is that it would conflict with established custom to the disadvantage of the foundry which conducts its business intelligently enough to make a fair profit. The average customer would immediately object to items higher than the per pound price he has been paying, and at the same time he would welcome changes to reduced costs. Where he has been paying a few cents a pound for all of his work a charge of 30 cents a pound on some expensive casting would stagger him. He would take advantage of the drop in price on heavier and simpler pieces, and then shop around to find what other foundries would do for him on the more costly work. There are foundries which would at least shade the quoted figure and would get the work. The foundry that took the initiative in changing the system would be placed in the position of losing a part of its business and lowering prices on the remainder. This is the argument of foundrymen, and doubtless it is logical enough, because long established custom has made conditions what they are. Yet measured by the standards of system as understood in almost every line of business it is an anomalous situation that makes it necessary either to overcharge or to undercharge in order to retain customers.

Foundrymen agree, however, that certain classes of work may be done by the piece, where the customer is reasonable as to questions of price. If a machine shop buys large numbers of identical castings in considerable lots, making something of a dependable demand upon the foundry, so that cost can be intelligently arrived at, a

piece price may be made, fluctuating, perhaps, with the iron market. The method has a tendency to eliminate disputes as to excess weight of castings. It can best be used, probably, where the customer has his heavy castings made in one foundry and his light work in another, so that there is less necessity of averaging costs.

It is believed that the jobbing foundry of the future will specialize, manufacturing castings within certain limits of weight. The work could either be all heavy or all light or all medium. There would be none of the present general system of accepting work of all sizes and weights. A foundry confining itself to one class of work would probably be conducted more economically as regards cost of production, as in every other instance of specialization in manufacture, and there would be a better foundation upon which to establish a system of ascertaining and keeping costs. Such a foundry would have strong influence in ridding the trade of its present customs. Whatever the means employed the change will come gradually. A strong influence in the direction indicated is the constantly increasing number of technically trained men in the business. Every impulse of such men should be toward putting the foundry trade on the same exact basis as exists in practically every other important line of manufacture.

Advance Bookings of Finished Material.

In the annual report of the British Iron Trade Association for 1906 the fact is referred to, in discussing the high tide of prosperity in the iron trade, that the United States Steel Corporation had on its books at the end of that year orders for finished material in excess of 8,000,000 tons. The report adds that the independent companies in this country might be presumed to have as much business on their books as the Steel Corporation, since the latter produces about half the finished steel of the country, and therefore that orders representing 16,000,000 tons were on the books of American steel manufacturers at the beginning of this year. The entire output of iron and steel in all rolled forms in the United States in 1905 was officially ascertained to be 16,840,015 gross tons. The statistics for 1906 are not yet available, but the corresponding total for that year was probably 18,000,000 to 18,500,000 tons. To say that orders for 16,000,000 tons were actually booked at the opening of 1907 means that all our manufacturers of rolled iron and steel had their capacity in all lines engaged ahead for almost a year. Such a statement is far from the truth.

Of the method by which the United States Steel Corporation computes the tonnage booked by its subsidiaries sufficient has not been made public to indicate how much significance is to be attached to it. It is not known, indeed, whether the same method has been followed from the beginning in making up this total, particularly as to the reckoning of the running contracts for plates for steel cars, or those for billets and sheet bars, which are on a sliding scale of prices. In a year like 1904, for example, the actual taking out of material under such contracts would be small, as compared with the rate contemplated in the contract or that at which shipments were made in normal times. It would make an important difference in the interpretation of the quarterly statements of unfilled orders whether a year's installment on such contracts were counted as on the books from a given date or only that of a single quarter. Another consideration applying to the published total is the extent to which cancellations would cause a shrinkage in case trade conditions changed for the worse. This is an old question and one which

always affords leeway for divergent views. Experience has shown that the binding character of an order acquires, in time of falling values or of shrinking consumption, an elasticity that could not have been suspected when the existence of prosperity was everywhere admitted.

If it is known that the same basis of calculation is maintained from year to year these figures of orders booked have a value for purposes of comparison, but it is not well to give them the dignity of statistics. That would lead easily to such unwarranted conclusions as that the American iron trade entered upon this year with practically a year's output upon the manufacturers' books.

CORRESPONDENCE.

Pneumatic vs. Electric Drills.

To the Editor: We have noted the remarks in *The Iron Age* of May 9, page 1424, covering "Pneumatic vs. Electric Drills." It would appear that in this article the same error was made as in other journals taking up this subject. The trouble started in the first place through the *Engineering and Mining Journal*, whose article was in general instead of making it specific, as the article was especially intended to cover rock drills. We manufacture and market a general line of electrical tools, including electric drills, portable grinders and blowers, tool post grinders, electric hoists and electric compression riveters, and such an article as that referred to is misleading and has a tendency to injure our business. There is no doubt about the durability and efficiency of all other lines of electrical tools and appliances, and unquestionably they are the most economical in operation and maintenance of any class of tools on the market. If your article had said "Pneumatic vs. Electric Rock Drills" then there would have been no question as to the accuracy of your comments.

CHICAGO PNEUMATIC TOOL COMPANY.

CHICAGO, May 27, 1907.

The Gayley Dry Blast at Isabella Furnaces.

An excellent record was made at the Isabella Furnaces of the Carnegie Steel Company with the Gayley dry blast in the month of May. A comparison of the work of No. 1 Furnace, working with dry air, and of No. 2 Furnace, blown with natural air, both using the same materials, shows the following results:

	Daily product.	Coke consumption.
No. 1, dry air.....	459 tons.	2,029 lb.
No. 2, natural air.....	351 tons.	2,372 lb.

This shows that the average product per day was greater by 108 tons, or 30.7 per cent., with the dry air blast than with natural air, and that the fuel consumption was 343 lb. per ton, or 14.4 per cent., lower.

It is worthy of note that No. 1 Isabella, which has made to date on one lining 611,679 tons, ought to be relined, while No. 2, which was blown in in 1906, has thus far made only 136,713 tons. The extraordinary results obtained with the furnace blown with dry air have therefore been achieved in spite of the condition of No. 1 Furnace.

Steel Rail Specifications.

The special Committee on Rails of the American Society of Civil Engineers, of which Joseph T. Richards, chief engineer of maintenance of way of the Pennsylvania Railroad Company, is chairman, held a meeting at Philadelphia on Friday, May 31. This committee presented a report at the meeting of the society held in New York in January, 1906, the specifications at that time submitted by the majority of the committee being in essential particulars the same as those adopted by the American Railway Engineering and Maintenance of Way Association and those put forth by the Rail Committee of the American Society for Testing Materials. It is understood that at the recent Philadelphia meeting of the com-

mittee proposals for changes in rail sections were considered. These and other features of the rail problem will be presented in a report of the committee to the meeting of the society in the City of Mexico in July. It is stated that the changes in rail section favored by well-known engineers, and which have been under consideration recently by representatives of the railroads, as well as of the rail manufacturers, will give more metal in the base and stem of the rail and thus insure more equal cooling in the operations of the mill, giving finer grained metal in the head of the rail.

Renewal of the International Rail Syndicate.

Dispatches from Paris refer to a meeting held there on May 14 at which the principal rail producers in Great Britain, Germany, Belgium and France were represented, resulting in the decision to continue the present international syndicate in rails for five years. It is to be questioned if the time feature of the agreement is given any particular importance by the rail manufacturers, as the syndicate is understood not to be bound by deposits of forfeit money or by other requirements of typical pools. The co-operation of the rail mills of the United States is reported to be assured, as has been the case in the past two years. In the past year the Viscaya rail mill in Spain, a Russian mill and an Austrian mill have caused some disturbance by operating apart from the international agreement. The Cargo Fleet Iron Works in England, which entered the rail field last year, taking a considerable contract in Argentina, have also operated outside. The *London Engineer* intimates that the British members of the syndicate have had to stand a reduction in their allotment, the syndicate managers arguing that the Cargo Fleet Works production must be counted as part of the British proportion of the world's rail trade.

How far the mills hitherto outside have been induced to co-operate with the syndicate is not known. It is said that the German members have endeavored to arrange with the Alpine Montau Company, the Austrian competitor, and that the Spanish Altos Hornos de Viscaya, which took some Mexican business last year, has been invited to co-operate. The Providence Russe of Mariupol, which could market its entire product at home but for the industrial stagnation now prevailing in Russia, is reported to have applied for membership in the syndicate. One report says that a working arrangement has been made with practically all the principal makers heretofore outside. The *London Engineer* says:

If these outstanding works have been brought within the fold of the new convention, it is to be feared that this has been effected principally at the expense of the British constituents, as the consumption of export rails does not largely increase year by year. This is illustrated by the fact that whereas the aggregate exports of all countries amounted to 1,300,000 tons in 1903, they only advanced to 1,375,000 tons in 1906, being merely an augmentation of 75,000 tons in three years. The question of the adhesion of a new rival in the North of England [Cargo Fleet] may have been settled; but nothing so far is known on the subject outside of quarters directly interested. The British producers and exporters of rails still maintain the leading position, but their tonnage and percentage of the aggregate trade of the world have considerably declined, and there is little hope of any material recovery, owing to the increasing output of other countries and the efforts of fresh competitors to gain a footing in the international trade.

As at present constituted the international rail syndicate is based on an agreement that depends very largely on the continuance of good times for its maintenance.

Steel rail exports from Great Britain in April were 43,003 gross tons, as compared with 32,841 tons in April, 1906, and 37,190 tons in April, 1905. For the four months ending April 30 the total exports were 141,562 tons, as against 133,700 tons in the like period in 1906, and 170,706 tons to April 30 in 1905. It is stated that the demand from Argentina is diminishing notably, while for South Africa there is an improved inquiry. However, the falling off in shipments to British India is the principal factor in the decline of this year's shipments from those of 1905. In the first four months of that year British India took 66,541 tons, and in the first four months of this year 36,300 tons.

April Exports and Imports of Iron and Steel.

According to the figures of the Bureau of Statistics of the Department of Commerce and Labor, both exports and imports of iron and steel increased in April as compared with March. The total value of exports of iron and steel and manufactures thereof, not including iron ore, was \$17,684,683 in April, against \$16,412,616 in March. The corresponding figures for imports are respectively \$3,723,176 and \$3,702,060.

The exports of commodities for which quantities are given reached 132,332 gross tons in April, as compared with 112,758 tons in March. The April figures are very much in excess of those for any month this year, and it will be necessary to go back to May, 1906, to find larger exports. For that month the figures were 136,592 tons, and in March of the same year the figures were 138,679 tons. The two months just named were the largest for a long period.

The following table gives the exports of these commodities for April and for the 10 months ending with April in 1907 and 1906:

	Exports of Iron and Steel.			
	April.		Ten months.	
	1907.	1906.	1907.	1906.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	8,211	7,483	71,701	47,412
Scrap	3,786	974	14,392	8,425
Bar iron.....	1,161	5,261	38,765	32,075
Wire rods.....	626	1,117	9,021	5,732
Steel bars.....	8,485	2,113	36,451	17,427
Billets, blooms, &c....	8,732	20,052	102,676	232,938
Hoop, band, &c.....	78	41	5,272	4,082
Steel rails.....	40,012	24,862	260,957	282,041
Iron sheets and plates	4,234	775	24,234	8,006
Steel sheets and plates.	9,825	11,389	81,706	62,714
Tin plates andterne plates	1,838	2,547	6,086	7,845
Structural iron and steel	13,724	11,236	103,799	78,683
Wire	14,846	16,173	138,666	130,433
Cut nails.....	1,202	446	6,554	5,789
Wire nails.....	4,195	4,734	33,277	36,457
All other nails, including tacks.....	566	615	5,651	3,391
Pipes and fittings....	10,811	10,201	105,038	123,617
Totals	132,332	120,019	1,044,246	1,087,067

The increased exports in April over March, as above shown, were largely due to the greater movement of steel rails. The total of 40,012 gross tons for the month was distributed among the following countries: British North America, 1362 tons; Central American States, 6218 tons; Mexico, 5361 tons; West Indies, 1406 tons; South America, 11,953 tons; Japan, 1525 tons; other Asia and Oceania, 12,187 tons. The other items quite generally showed an increase in April as compared with March, but steel billets and blooms, on the contrary, fell rather sharply, as the figures for March were 14,343 gross tons, while for April they were 8732 tons.

The imports of commodities for which quantities are given show a total of 74,495 gross tons in April, as compared with 70,611 tons in March. Imports of these commodities for April and for the 10 months ending with April in 1907 and 1906 were as follows:

	Imports of Iron and Steel.			
	April.		Ten months.	
	1907.	1906.	1907.	1906.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	61,304	22,735	453,685	220,036
Scrap	1,408	1,200	14,654	23,921
Bar iron.....	1,189	1,423	31,244	32,494
Rails	400	50	3,924	8,489
Hoop, band, &c.....	10	891	4,068	8,614
Billets, bars and steel in forms n.e.s.....	926	1,308	16,156	15,774
Sheets and plates....	247	241	3,024	2,253
Tin plates andterne plates	6,468	3,563	51,875	44,517
Wire rods.....	1,395	1,631	14,530	15,445
Wire and articles made from	810	584	7,002	3,475
Structural iron and steel	338	4,156	8,926	30,373
Totals.....	74,495	37,782	609,088	405,391

The total exports of all kinds of iron and steel and manufactures thereof, not including iron ore, were valued at \$149,710,569 in the 10 months ending with April, as

compared with \$131,214,260 in the corresponding period of the previous year. Similar imports for the same periods were respectively valued at \$32,795,503 and \$23,296,873. The imports of iron ore in April were 137,605 gross tons, as compared with 75,997 tons in the preceding month and 81,646 tons in April, 1906.

The Cincinnati Metal Trades Quarterly Meeting.

The quarterly meeting of the Cincinnati branch of the National Metal Trades Association was held May 31 at the clubhouse, Chester Park, with a very full attendance. President S. P. Egan of the J. A. Fay & Egan Company was chairman of the meeting, and J. C. Hobart of the Triumph Electric Company acted as toastmaster at the banquet.

The speaker of the evening was M. W. Alexander of the General Electric Company, Lynn, Mass., and in introducing him Mr. Hobart commented on the fact that there were no schools for the training of apprentices in or near Cincinnati. Mr. Alexander gave a description of the workings of the school established by the General Electric Company for this purpose. He said that if there was a dearth of mechanics and other skilled labor the employers of the country have no one to blame but themselves, as by properly meeting the issue and providing a system of training for the boys of the workshops this can be easily overcome and help secured of the kind most desirable. His company now has between 400 and 500 apprentices in training, and is graduating two a week, capable of securing skilled positions where desired. The pay for the apprentices during the four years of training is 9 cents per hour for the first year, 12 for the second, 14 for the third and 16½ for the fourth. Viewed from an economic standpoint, he said that the proposition was a success, so far as his company was concerned, as by systematic training a boy earning 12 cents per hour could perform just as good work as a man, whose wages were twice as great.

E. H. Hargrave of the Cincinnati Tool Company followed, stating that he thought it would be a good plan for the manufacturers of the city and vicinity to organize and form a school of this character. F. A. Geier of the Cincinnati Milling Machine Company then spoke upon the subject, stating that he had thoroughly canvassed the situation, visited a number of plants and prepared considerable data relating to this subject, and that there apparently was no other course to pursue except to take the necessary steps toward the formation of a practical training school. To bring the matter intelligently before the assembly he offered the following resolution, which was unanimously adopted:

Resolved, That the president of this association be empowered to appoint a committee of five to fully investigate and recommend some feasible plan looking to the establishment of a trade school in this city, and report at the special call of the president.

Driving a Spike Under Water.—It is sometimes necessary to drive a spike under water, and much difficulty is experienced in the operation. It has been suggested that a piece of gas pipe large enough to hold the spike comfortably, and small enough to keep it upright, might be used in conjunction with a steel drift slightly longer than the pipe. The length of the pipe will depend upon the depth of the water, while the drift should leave a hand hold above the pipe. By means of this expedient nails can be driven in several feet of water, and at any angle desired, as the spike will necessarily go at the angle at which the pipe is held, and the drift readily transmits the hammer blows to its head. This has been found a great help in building bottoms for foundations.

With impressive ceremonies ground was broken at Seattle, Wash., on June 1 for the Alaska-Yukon-Pacific Exposition, which will open June, 1909. Its purposes are the exploitation of the resources and potentialities of the Alaska and Yukon territories in the United States and Canada, and to make known and foster the importance of Pacific trade.

Electric Steel Making Furnaces.

Report of J. Saconney, a French Engineer.

As one of the members of a commission instructed by a leading Italian works to study electric steel manufacture, J. Saconney, a French engineer, visited plants at which the Stassano, Héroult and Girod processes were in use. The results of these studies were presented to the Société de l'Industrie Minérale, at Saint-Etienne, in the form of a paper, with full details of the observations made. These present a number of new facts, particularly as to the works of the Stassano and Girod furnaces, concerning which we refer to the original source. Special interest attaches, however, to Saconney's conclusions on the quality of steel electrically produced and his critical comparison of the three methods studied.

An Extraordinarily Pure Product.

From the chemical point of view, says M. Saconney, steel made in the electric furnace possesses an extraordinary purity, the percentage of sulphur and phosphorus being always very low. Even in the case of casts made without any special precautions, a frequent and easily attained result is to have only traces of these elements. The percentages, too, of silicon and manganese may be easily reduced to a minimum.

The works at La Praz has for a long time succeeded in making an almost chemically pure iron, one ingot having been shown at different exhibitions which contains 99.95 per cent. of iron, the total of the other elements—silicon, sulphur, phosphorus and manganese—hardly reaching 0.05 per cent.

Among the casts made at the Girod Works at Ugine, No. 196, in which the aim was simply to make an extra soft steel, without special treatment, carried 99.83 per cent. of iron. Such a composition cannot be reached in ordinary practice in the open hearth furnace, and if at times it has been attained it has only been by special refining and casting temperature.

Special Mechanical Properties of Electric Steel.

From the point of view of mechanical properties, the first striking fact is the facility with which these steels can be forged, even with high carbon contents and low manganese. M. Saconney states that he has witnessed at Ugine the forging of a sample containing more than 2 per cent. of carbon, which might almost be classed as pig iron. This steel, treated without precautions in a forge fire at a pretty high temperature, forged under a hammer too powerful for the size of the piece, proved to be as malleable as soft steel. Repeated tests on other pieces, varying in carbon, but in all cases high in that element, and in some instances as high as 0.05 per cent. in sulphur, have always been as conclusive. Fractures of these steels do not at all resemble those of open hearth steels of the same composition.

Until now it has only been possible to explain the special physical properties of electric steel by the total absence of nitrogen in the metal, as the result of the method of manufacture. This hypothesis seems good, but possibly it is not the only reason. The future may, perhaps, bring out another explanation dealing with the special molecular state of a bath of steel through which a powerful electric current has passed.

Comparison of the Three Systems.

M. Saconney makes the following comparison of the three systems:

The Stassano, elegant and attractive though it be in principle, has the great disadvantage when compared with the two others that it does not reach as high a temperature, and that it is difficult, without an exaggerated expenditure of power, to make dead soft steels, difficult to melt. This branch of manufacture is of particular interest in automobile building which consumes a large quantity of ornamentation steel. However, this furnace may be advantageously used in the manufacture of tool steels, when using pure materials, and may therefore replace the crucible furnace. M. Saconney states that he does not think that, as built at the present time, it will be economically employed in the manufacture of

such steel products as that now produced in the open hearth furnace. Another drawback of the Stassano furnace is that the cost is high, owing to the lining, which on account of its shape must be entirely built with special brick. Besides, this lining deteriorates more rapidly than that of the other furnaces, since it is subjected, more directly than they are, to the temperature of the arc.

A comparison is particularly interesting between the Héroult and Girod furnaces, which at first sight seem very similar and both of which permit of making all the grades of steel which until now have been made either in the crucible or in the open hearth furnace.

THE HÉROULT FURNACE.

The Héroult furnace utilizes a tension of 120 volts, while the Girod furnace, with a single electrode, cannot absorb more than 60 volts. The reduction in the voltage is an advantage of the Girod furnace, because it simplifies the construction by avoiding the difficulty growing out of isolation, and because it renders operations much easier and rapid by avoiding the direct short circuit, between the electrodes, which makes the operation of the Héroult furnace very irregular, and even dangerous when starting with solid raw materials. The increase in intensity is a disadvantage of the Girod furnace. Theoretically, it would double the cost for the conductors of the current. This increases the cost of the first installation but has no influence on current running, while the reduction of the voltage brings about very great advantages and simplification in the running and operation of the furnace.

THE GIROD FURNACE.

The arrangement for the suspension and the regulation of the electrodes is much more simple and practical because it has the advantage of removing the delicate regulating apparatus, the greater part of which may be located at a distance, out of the way of dust, for instance in the engine room. In the case of the Héroult furnace, this apparatus must be located in the furnace itself. Finally, the cost of construction of the Girod furnace is considerably less than that of the Héroult furnace. At first sight, the Girod furnace seems much more complicated with its hearth. This, however, is not the case. The metallic parts placed in the masonry are very simple and cheap. The body of magnesite brick is smaller, and, thanks to the water circulation in these pole pieces, the hearth, cooler in contact with these pieces, lasts indefinitely. Since it has only one electrode, only one regulating apparatus is needed, which is simpler and cheaper than that of the Héroult furnace.

Westinghouse Electric Business.—The following figures show the Pittsburgh orders, shipments and collections of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., for six years ending March 31 last, exclusive of subsidiary companies:

	Orders.	Shipments.	Collections.
1901-2.....	\$17,927,339	\$17,804,182	\$16,947,774
1902-3.....	19,522,144	21,490,708	20,445,443
1903-4.....	18,509,054	21,122,646	21,874,228
1904-5.....	16,570,617	18,069,862	20,546,478
1905-6.....	24,938,631	21,059,249	21,649,184
1906-7.....	34,170,647	29,189,844	30,549,894
Totals.....	\$131,638,434	\$128,736,493	\$132,111,004

The deductions from the above shipments by reason of bad debts for the six years were about one-tenth of 1 per cent. It has been the policy of the company not to involve itself directly or indirectly during these years in any underwritings, or in the taking of securities as part payment for apparatus supplied, except only when such securities could be promptly disposed of and the proceeds turned into cash collections.

The use of aluminum wire has made it feasible to dispense with the insulation in winding magnets for moderate potentials, the natural oxide on the surface of the wire being, it is said, sufficient insulation for all voltages up to 200. Above this figure wet paper is put between the layers, and for still greater potentials the wire is dipped into a chemical bath to increase the amount of oxidation.

Electro Deposition of Brass.*

BY CHAS. H. PROCTOR, ARLINGTON, N. J.

Not since the French Syndicate controlled the copper markets of the world, more than 20 years ago, has copper reached such an intrinsic value as it has to-day. This is not due to any combination of labor or capital, but to the natural results of supply and demand.

When we take into consideration the unprecedented demand for copper created by the vast changes that are taking place in the great motive power systems, from steam to electricity, and the tremendous amount of copper consumed in these changes, it is not necessary to go very deeply into details to know why copper has reached the high price at which it now stands. The high price of copper has had such an effect on the brass industry that in many lines of manufacture articles usually made of brass or a similar alloy, that metal has been replaced with iron, steel and tin; and with alloys of lead, antimony, spelter and combinations of these metals. In fact, wherever possible the baser metals have been used to cheapen the cost of production.

As brass consists essentially of an alloy of 2 parts of copper to 1 of zinc, we should expect that for the same alloy in the electro depositing of brass the same essential proportions would be necessary to produce like results. But in making a careful study of this question in practice I have found that to produce like results from a two-and-one mixture it is necessary to use 3 parts of copper to 1 of zinc for the deposited alloy.

The Brass Bath Not Necessarily Difficult.

Of the various metallic deposits now employed by the plater there is none that gives so much trouble and needs such careful treatment, for good results, as the brass bath, and this is the consensus of opinion of nearly all platers. While this may be true in many cases, in my own practice I have found the brass bath as easy to keep in working condition as copper or nickel, silver or gold. One thing is important for successful results in brass plating, and that is a study of the alloys of copper and zinc to understand the variation of color resulting from the increase or decrease of the amount of copper employed. In the alloy of the foundry the two-and-one mixture produces the full yellow or rich brass. This color is produced with slight variation even when 80 parts of copper and 20 parts of zinc are used. When we go below the two-and-one mixture, even as low as equal parts of each metal, we find the yellow color still predominates. This variation of color in proportion to the mixture of the alloy is well understood by the brass foundryman, but to many electro platers is an unknown quantity, and this is where the trouble comes in. It is not always the effect of too much cyanide, too much ammonia, or a too concentrated or an insufficiently dense bath, but an excess of zinc that causes the trouble. This is shown by excessive spotting out, easily tarnished deposits, or deposits that materially change their color when lacquered. To all this the plater endeavors to find a remedy.

We have said that even below the two-and-one mixture yellow colors still predominate. As an example: To-day the brass bath is normal; work is done all day with satisfactory results. To-morrow a slight variation of color is noted, with a tendency toward a slight reddish yellow. In nine cases out of ten an addition of zinc will be made when, according to the study of the alloys, copper should be added to reimburse the loss noted by the change in color. When it is remembered that copper is essentially the great factor in a well composed brass bath, which consists largely of this metal, and that zinc is withdrawn very slowly, the bath should be regulated with copper.

In the composition of brass baths there is very little change from the formulas prescribed by the great master Roseleur, whose directions stand pre-eminently above others in their successful working. This applies not only

to brass solutions, but to nearly all metals that are employed in the art of electro deposition. It is not necessary for me to go into details of formulas, for all platers know that a brass bath consists mainly of the carbonates of copper and zinc in their solvent of cyanide of potassium, with the additions of the sodium carbonate and bisulphite of soda as conducting salts to increase the electrical conductivity; there are also slight additions of ammonia to assist in maintaining color.

Suggestions as to Anodes.

Some operators use anodes of copper constantly in their baths, adding zinc when necessary to maintain color. This is good practice, for with an anode surface of all copper the plater can make no mistake as to the metal necessary to produce the desired color. In my own practice I use anodes of cast copper and zinc in the proportion of 3 anodes of copper to 1 of zinc. In this manner I find it possible easily to maintain a uniform deposit by the addition of cyanide and the soda salts, with occasionally an addition of the metallic salts. A slight amount of zinc dissolved in ammonia water, thrown toward the copper, will instantly change the color of the deposit.

I have stated that in the composition of brass baths there is nothing new; but I have in mind one compound that has appeared within the past year or two. I refer to cuprous sulphite, or red copper compound, which is rapidly replacing the acetate and carbonate of copper in the production of deposits of copper, bronze and brass. The results obtained with this compound have been eminently satisfactory. Its use avoids to a large extent the trouble experienced in plating iron, in the nature of blistering. It also does away with this trouble in the deposits upon lead and its alloys. A standard solution that can be made the basis of a copper, bronze or brass bath consists of

Water	1 gal.
Cyanide of potassium.....	.6 oz.
Cuprous sulphite.....	2½ oz.
Sodium bisulphite.....	2½ oz.

For the production of bronze or brass by this formula, carbonate of zinc is dissolved in cyanide of potassium and water in the proportion of 1 part carbonate to 2 parts cyanide, making a concentrated solution. By adding ¼ part of the amount of cuprous sulphite used, a bronze bath will be the result; with the addition of ¼ part a good brass bath will be obtained.

It will always be found more satisfactory, when producing deposits of alloys, to prepare first the copper bath, and then make the additions of zinc when the bath is in working condition.

Simplon Tunnel Electric Locomotives.—The electric locomotives built for the operation of the trains through the Simplon tunnel measure 40 ft. 5 in. over the buffers, with a total wheel base of 31 ft. 10 in. and a driving wheel base of 15 ft. 3 in. The driving wheels have each a diameter of 64½ in.; the leading and trailing wheels of 33½ in. The total weight of each locomotive, ready for service, is 62 tons, of which 42 tons rest upon the drivers, being thus effective in providing for the tractive effort. The total weight is divided between that of the mechanical portion (34 tons) and the electrical gear (28 tons). The normal working output of the motors is 900 hp., with maximum overload capacity up to 2300 hp. The designed speeds are two in number—34 and 68 km. (21.7 and 42.3 miles) per hour. At the higher speed the tractive power is 3½ tons normal and 9 tons maximum; at the lower speed these figures become, respectively, 6 and 14 tons. The speeds of the rotor for the two speeds of train are 112 and 224 rev. per min.

The Jones & Laughlin Steel Company, Pittsburgh, which owns extensive coal fields in the fourth and fifth pools on the Monongahela River, contemplates extensive additions to its fleet of towboats in the coal trade. The company has asked for bids on 50 barges to be built from Oregon fir. Each barge will cost about \$2500, making the cost of the new fleet about \$125,000. The company also contemplates building several new steamers.

* A paper read at the Philadelphia convention of the American Foundrymen's Association, May 22, 1907.

The German Tariff Agreement Proclaimed.

WASHINGTON, D. C., June 4, 1907.—The provisional reciprocity convention between the United States and Germany, the details of which have heretofore appeared in *The Iron Age*, was officially proclaimed on the 1st inst. All its provisions, however, will not go into force contemporaneously. The agreement made a year ago, under the terms of which American products have enjoyed the minimum rates of the German tariff, will not expire until July 1, and until that date the entire conventional schedule will be applied to imports from the United States.

Customs and Consular Regulations.

Contrary to expectation, the modifications in the customs regulations of the United States will be put into force immediately, and will not await the expiration of the existing *modus vivendi*. The changes in the Consular regulations, however, cannot be put into force until copies of the revised code can be forwarded to American Consuls by mail. So far as the service in Germany is concerned, it is expected that the new practice will be installed about the 15th inst. The text of the modified customs and Consular regulations was printed in *The Iron Age* of May 9.

After full deliberation the Administration has decided to extend the modifications in the customs and Consular regulations to the products of all countries, except in the case of certain provisions of the new Consular code, which apply in terms to Germany only. The new regulations provide that special agents "sent by the Treasury Department to investigate questions bearing upon customs administrations, shall be accredited to the German Government through the Department of State at Washington and the Foreign Office at Berlin, and such agents shall co-operate with the several Chambers of Commerce located in the territory apportioned to such agents." It is not proposed at this time to apply this provision to special agents making investigations in other countries than Germany, as there has been no demand for such an innovation from any other Government. It is possible that the regulation may ultimately be extended to France, as the headquarters of the Treasury Department's foreign staff has long been located at Paris, and it may be found desirable in view of the tariff arrangements just concluded, and those still pending to give the Special Agents' Bureau a better official status than it now enjoys.

The agreement with Germany also provides that "the certificates as to value issued by German Chambers of Commerce shall be accepted by appraisers as competent evidence, and be considered by them in connection with such other evidence as may be adduced." But it is not deemed practicable to extend this provision to other countries, for the reason that there is nowhere else the semi-official organization of domestic trades as exists in Germany, and there are no bodies corresponding at all closely to the German Chambers of Commerce.

"Export Values."

Much misapprehension exists as to the general subject of export values for invoicing purposes, and especially as to the evidence that will be accepted by the customs authorities with relation thereto. The impression seems to be current that export values will be accepted by the appraising officers in all cases in which they may be tendered, and that the declaration of the shipper that the goods are not sold in the domestic markets will be accepted as final and conclusive. This is wholly erroneous. In the first place, the Treasury Department will insist upon the same careful investigation of export values as is now made in the case of "foreign market values." Second, the fact that the goods exported differ slightly from those sold for domestic consumption will not be accepted as a sufficient reason for a reduced export price. Finally, the Department will make careful comparison of the valuation of goods alleged to be made for American markets with that of the same or similar products exported to other countries. It may be assumed, therefore, that no avenue of undervaluation will be opened up as the result of the application of the principle involved in the new agreement, but that the rev-

enues of the Government and the interests of domestic manufacturers will be as fully safeguarded as heretofore.

The Outlook for a French Treaty.

The Secretary of State and the French Ambassador have had several conferences during the past week on the subject of the tariff relations of France and the United States. A tentative draft of an agreement is now being formulated by the State Department, and will provide for a 20 per cent. reduction in the duty on French champagnes in exchange for the minimum rates of the French tariff on a large proportion of the products which we now export to France. It will also be provided that the French products enumerated in the existing agreement negotiated under section 3 of the Dingley act shall continue to enjoy the special rates specified therein. It is not the present intention of the State Department to send a commission to Paris in connection with this treaty, as it is believed that a satisfactory agreement can be reached on the basis of data now in the Department's possession.

W. L. C.

The Susquehanna Iron & Steel Company's Sale.

At Columbia, Pa., on May 31, the property of the Susquehanna Iron & Steel Company was sold at receiver's sale. The purchaser was Michael Blake, of the well-known firm of John Leonard & Co., New York. The price paid for the property was \$410,000, subject to a mortgage of \$300,000. Mr. Blake also bought all the personal property of the company, consisting of raw material and finished product on hand, as well as a stock of supplies, for \$150,000. The company's manufacturing property consists of a rolling mill at York, the Vesta Furnace at Watts, the Aurora Furnace at Wrightsville, and the Columbia, Susquehanna, Union street and East End rolling mills and a pipe mill in Columbia. Both the blast furnaces are within three miles of Columbia and are in good condition. The Columbia, Susquehanna and York mills roll skelp iron, while the other mills manufacture bar iron. The product of the skelp mills is completely absorbed by the large pipe mill quite recently built, which has a capacity of 150 tons double turn per day, and is claimed to be one of the best equipped plants of that kind in the East.

The property was purchased by Mr. Blake in his own name and not as the representative of any of the creditors or bondholders. He has associated with him two gentlemen of ample means whose names are withheld for the present. The organization is absolutely in his hands and he has already practically arranged with men to take the management of the reorganized company, who are well known in the iron trade, having had large experience in the rolling mill business. Mr. Blake expects to be one of the officers of the new company and will announce his arrangements within a week or two. It is the intention of the new ownership to run all the plants of the company double turn, particularly the skelp and pipe mills, as the demand for pipe is at present so heavy as to insure a very satisfactory profit on manufacturing operations. It is further the intention to put the two blast furnaces in operation as soon as possible as the skelp mills will practically absorb the output of both furnaces. Mr. Blake is a very prominent figure in the Eastern iron trade, having for years managed the large business of John Leonard & Co., dealers in old material, and his connections are of the highest character. It may be expected that with his guidance the affairs of the reorganized company will be conducted successfully.

Last month the 42-in. universal plate mill of the Youngstown Sheet & Tube Company, Youngstown, Ohio, rolled nearly 11,000 tons, about half of the tonnage being iron. Had the output of this mill been steel exclusively it is very probable that the tonnage rolled would have been much larger, as the capacity of this mill is rated at about 12,500 tons a month when rolling steel plates exclusively.

Mexican Railroad and Industrial Notes.

DURANGO, May 29, 1907.—The contractors, Bell & Semmes, who have the work of the first 50 km. out of Tampico, of the Mexican Central's short line between that port and the city of Mexico, have begun preliminary operations.

Construction work has been commenced upon what is known as the Honey road, which is to connect Pachuca and Zimapan.

The Mexican Central has completed the roadbed of its line between Marfil and Guanajuato, and is about to lay the rails. This road is one of 6 km. only, but is of great importance to the mining interests of the district.

Good progress is being made upon the Kansas City, Mexico & Orient in Chihuahua. The president of this road personally conducts prospective investors periodically over the completed portions of the line in the United States and Mexico, winding up the excursion with a banquet in the City of Mexico. The plan appears to be a successful one. According to report Mr. Stilwell is credited with the intention of building another line in Mexico when the one now under construction is completed. This is projected from Del Rio, Texas, south through the State of Coahuila, touching Saltillo, and through the States of San Luis Potosi and Queretaro to Mexico City, and north from Del Rio, Texas, to connect with the Orient at San Angelo, Texas.

The Rio Grande, Sierra Madre & Pacific is to be extended without delay to the proposed terminal at Guaymas. A branch line is also to be constructed to San Agiabampo. This road is a project of Col. W. C. Greene, whose mining properties it will benefit, and will have a connection with the Cananea, Yaqui River & Pacific, and with the Kansas City, Mexico & Orient.

Work has been commenced by the Southern Pacific in Sonora upon a line to connect Nacojari and Guaymas by means of the Yaqui River branch of the company's Guadalajara line.

Surveys have been made for a line to run from a point near Colima to certain tracts of timber owned by the Colima Lumber Company, with the object of making a connection with the Central's proposed Autlan branch.

Industrial Notes.

The following summary is made from a report showing the number and cost of locomotives and the quantity of steel rails imported into Mexico from the United States during the eight months from July to February of the current fiscal year:

	Locomotives.		Steel rails.	
	No.	Total value.	Tons.	Total value.
1906.				
July	5	\$37,328	1,159	\$36,467
August	4	52,580	3,713	109,180
September	7	106,550	778	22,853
October	11	143,125	1,305	48,254
November	23	321,839	3,832	114,689
December	23	267,054	3,901	142,286
1907.				
January	1	19,000	5,166	165,468
February	5	40,720	2,904	100,658
Eight months....	76	\$988,696	22,758	\$739,855

During the same period rolling stock in the form of passenger and freight cars aggregating in value \$1,520,941 was purchased by the railroad companies.

In the seventh month of the current fiscal year foreign merchandise valued at \$20,743,137.91 was imported; the exports aggregated \$23,300,946.02. The imports included the following:

Machinery and apparatus.....	\$1,857,257.99
Vehicles	697,022.87
Arms and explosives.....	280,184.14

In addition to the precious metals, the exports for the month alluded to (January) included: Copper, \$1,894,540; lead, \$272,697; zinc, \$297,772.

W. B. Carrol, who has long resided in the city of Guadalajara, is about to erect a brass foundry there in the building and equipment of which \$100,000 will be invested. Steam valves and plumbers' supplies will be turned out of the shop.

J. J. D.

The Lukens Company Purchases the Allegheny Property in Virginia.

The Lukens Iron & Steel Company, Coatesville, Pa., has acquired the properties of the Allegheny Ore & Iron Company of Virginia, which owned and operated the iron ore mines at Oriskany and Vesuvius, Va., and the blast furnaces at Buena Vista, Iron Gate and Shenandoah, Va. The controlling interest in the Allegheny Ore & Iron Company has been owned by the Empire Steel & Iron Company, whose holdings have been bought by the Lukens Iron & Steel Company, as of June 1.

The management of the Allegheny Ore & Iron Company will remain as heretofore under the direction of C. H. Zehnder as president and W. W. Taylor as general manager. C. L. Huston of the Lukens Iron & Steel Company becomes vice-president. The headquarters of Mr. Zehnder will be at 140 Cedar street, New York, while the general office of the company will continue at Clifton Forge, Va.

During the past four months the Lukens Iron & Steel Company has had the mineral property thoroughly prospected and tested by drilling, under the direction of E. V. D'Invilliers of Philadelphia. These investigations have demonstrated to its entire satisfaction that the property contains what is generally believed to be the largest body of brown iron ore in Virginia.

The Lukens Iron & Steel Company is one of the largest makers of basic open hearth steel and steel plates east of the Allegheny Mountains, as it is the oldest plant in the country engaged in producing plates. The company has never had any ownership or control of mineral property or of blast furnaces, purchasing all of its raw material in the open markets. The acquisition of the Allegheny property gives the Lukens Company the ownership of mines in which a very large tonnage of ores is in sight, with the probability of developing a very much larger quantity. These ores are peculiarly adapted to the manufacture of a high grade basic pig iron, as the records of the output of the Allegheny furnaces show. The iron is relatively low in phosphorus and is low in manganese and sulphur. The capacity of the three furnaces of the Allegheny Ore & Iron Company is between 300 and 350 tons per day, which does not cover the requirements of the Lukens Iron & Steel Company. There is the probability, therefore, that an additional furnace will be erected on the property in the future.

The sale by the Empire Steel & Iron Company of the securities of the Allegheny Ore & Iron Company held in its treasury will enable the Empire Company to carry into effect plans which have been maturing for some time by Leonard Peckitt, the president of that company. These include the construction of a modern blast furnace at the Catasauqua plant of the company, and possibly the erection of an additional furnace at Oxford, N. J., where the company owns magnetic iron mines which are regarded as being of unusual magnitude and value.

Large Ocean Steamships and Harbor Problems.

Steamships are increasing in all dimensions, and particularly in draft, much more rapidly than are the entrance channels of the ports in which they trade. Of 208 ports handling nearly all the seaborne commerce of the world, 138 in 1904 had less than 30 ft. of water at low tide, and 95 had less than 30 ft. at high tide. Of the remainder, 70 had 30 ft. or more at low tide and 113 had 30 ft. or more at high tide. In a number of these ports more or less extensive harbor improvements were at that time under way, a large portion of which has now been completed. When all of these improvements are completed the number of ports having less than 30 ft. of water in their channels will still be 116 at low water and 71 at high water.

The Ohio Rail Company, Newark, Ohio, manufacturer of light steel rails, has its product sold up for the next two months or more, and in order to get out maximum output its plant will hereafter be operated on three turns of 8 hr. each.

A New Tropenas Steel Foundry.

A. Tropenas, Paris, France, who has been in this country recently, has completed arrangements for the incorporation in Delaware of the Tropenas Steel Company, with \$500,000 common stock and \$250,000 preferred stock. A tract of land on the Delaware River on the western outskirts of New Castle, Del., has already been bought. It contains about 90 acres and has a frontage of 1200 ft. on the river. The new company will probably arrange for the use of the adjoining dock of the old Morris & Tasker Company pipe and tube mill. Work will begin at once on the erection of a steel foundry, which will be equipped with two 2-ton Tropenas converters, and the product will be a general line of small castings. Several persons in this country are associated with Mr. Tropenas in the enterprise, but the complete personnel of the company is not yet announced. Mr. Tropenas has patents pending on a converter of about $\frac{1}{2}$ -ton capacity, and has introduced some improvements in connection with its operation. The original Tropenas patents have expired. The new converter is designed to meet the call that has come for a steel casting plant involving a comparatively small investment and that can be operated merely as accessory to a gray iron or malleable foundry or to a machine shop.

Pennsylvania Business Legislation.

HARRISBURG, PA., June 4, 1907.—The bills left by the recently adjourned State Legislature having a direct effect upon business in Pennsylvania are practically disposed of, with the exception of the employers' liability bill and the various miners' bills, which make a number of changes opposed by the employers because of the effect it would have upon discipline and the recovery of damages.

The expected railroad regulation is provided for by the approval of five so-called railroad bills. The chief of these is the railroad commission bill, which provides for a commission of three, to assume office on January 1, 1908, and to have wide powers of inquiry, even to the extent of entering offices and examining books, contracts, leases and all other matters. It has no power to inflict punishment, but can only recommend to the Secretary of Internal Affairs suits for violation of laws relative to discrimination, equipment, &c. If the Secretary approves, the causes will be laid before the Attorney-General for such action at law as he may deem expedient for the public good, this being explicitly set forth.

The other bills are designed to make the commission effective. They are termed "enforcers of the constitution," as the document adopted in 1873 contained a number of provisions relative to transportation which it seems were never enforced because it was decided that it took acts of the Legislature to put them into operation. The sections to be enforced are prohibiting discrimination in distribution of cars or motive power and in rates for freight or passengers; the offering or accepting of rebates; the merger of competing transportation lines, whether by property or stock, the fact of competition or parallel to be determined by trial by jury in a civil court; and prohibiting any transportation company from engaging in mining or manufacturing or acquiring or holding land other than needed for purposes of a common carrier, and shipping products of factory or mine over its roads exceeding 50 miles in length.

The State Water Supply Commission is given full authority to pass upon all dams, wing walls, embankments or wharves for railroad, water power or transportation purposes. All such intended improvements must first be submitted to the commission in blue print and its permission obtained before any work is done. This is also extended to extensions of existing works. The design of this bill was to give the State greater control over streams furnishing water power, in order to halt erection of large power plants which might injure adjacent land. A similar idea in regard to construction of railroad embankments with consequent diversion of currents to detriment of opposite banks was also behind the bill. This bill gives the State complete control of all water supplies

in Pennsylvania, as no water supply company can be chartered without permission and complete approval of its entire area of supply.

A. B. H.

Economies of the Rateau Regenerator in Blooming Mill Work.

A description was given in *The Iron Age* of March 14, 1907, page 832, of the low pressure steam turbine and regenerator on the Rateau system, installed at its South Chicago Steel plant by the Wisconsin Steel Company (International Harvester Company). This was the first complete equipment put in in this country, though there are many similar installations at European rolling mills. In an article in *Power*, F. G. Gasche gives the results of tests conducted at the South Chicago plant to determine the steam consumption of the turbine per unit of power and to measure the actual amount of steam available for the use of the turbine as delivered from the main engine.

The practice at the South Chicago mill is to roll billets of $3\frac{3}{8}$ -in. square section from an ingot weighing 5490 lb., the butt end of which is $17\frac{3}{4} \times 20$ in. Under normal conditions from 16 to 17 ingots are rolled per hour. Each ingot requires 21 passes through the rolls, during a few of which the work demanded of the engine is as low as 2,500,000 foot-pounds. During the complete mill treatment of an ingot, or through a "mill cycle," the engine exerts an aggregate of 11,000,000 foot-pounds, approximately in about 200 seconds. When 16 ingots are rolled per hour there is approximately 20 per cent. of the total time during which the mill is supposed to be in operation when the engine is idle, or running so slowly that the work, outside of friction, is negligible. Thus the horsepower of the engine may be considered as "distributed over the hour." The writer of the article says: "This is a particularly convenient form of statement when the applications of the steam turbine are contemplated, as the delivery of the turbine is unquestionably independent of any ordinary mill interruptions in the presence of a steam regenerator of suitable capacity."

In summarizing the data as to the performance of the South Chicago plant the article says: "The 42 x 60 in. engine at the International Harvester Company's plant requires an average of 52,400 lb. of steam per hour, with a horsepower, distributed over the hour, of 820. This makes 64 lb. of steam per hour per indicated horsepower. The same amount of steam on turbines of suitable capacity will enable the delivery of 1510 hp. at the switchboard, at 33.6 lb. of steam per horsepower hour. This makes the performance of the plant 2330 hp. delivered for 52,400 lb. of steam, or a steam rate of 22.5 lb.

"If the mill is credited with the fuel value of the power delivered by the turbines, it is easy to derive the saving to the plant resulting from the combination of simple reversing engine and turbine. Assume that a boiler horsepower costs \$60 per annum. Then 52,400 lb. of steam per hour is approximately 1750 boiler horsepower, costing \$105,000. With the original delivery of the engine of 820 h.p., the cost is \$128 per indicated horsepower delivered. With the turbine in operation the cost per horsepower per annum is reduced to \$45.70, or a saving to the mill of \$67,500 on the basis of 820 h.p. from the roll train engine.

"The low pressure turbine occupies a territory for the conversion of heat into work that cannot be appropriated by any other form of heat motor. The practical conclusion is warranted, therefore, that the combination of the ordinary reversing engine with a low pressure turbine will return more power for a given weight of steam than any system of compounding of such engines. Assuming that the compound reversing mill engine is large enough to operate the rolls as a noncondensing engine, it is easily seen that it is a means of great saving to pass the steam direct to a steam turbine."

The Morgan Engineering Company, which has been considering the question of moving its large plant from Alliance, Ohio, to some city where better facilities would be afforded, has decided to remain in Alliance, and announces that it will continue the contemplated improvements to its present plant.

PERSONAL.

Hazen Brown has been elected vice-president and general manager of the Shenandoah Steel Wire Company, Buffalo, N. Y., to fill the vacancy caused by the recent death of W. W. Gibbs.

Morris Bush, assistant to the president, and Otto Schultz, treasurer and auditor, will retire from the Alabama Consolidated Coal & Iron Company on July 1.

E. H. Flinn of Detroit has been elected president of the recently formed Lake Superior Iron & Chemical Company, to fill the vacancy caused by the death of J. H. Berry.

Theodore Starrett has resigned the presidency and the executive management of the business of the Thompson-Starrett Company, New York. He was elected chairman of the Board of Directors and will remain with the company and retain his interest in its development. The step has been taken by Mr. Starrett to relieve himself of the burden involved in the management of the details of the business. Albert B. Boardman was elected president.

H. K. Myers, formerly connected with the engineering and sales departments in the Pittsburgh office of the Allis-Chalmers Company, has resigned to become assistant general manager of the Pittsburgh-Buffalo Company, Frick Building, Pittsburgh, miner and shipper of coal and coke.

Charles W. Brooke, formerly of the firm of Brooke & McConnell, advertising agents, Lewis Block, Pittsburgh, which has been dissolved, has been appointed sales manager of the Williams Gauge Company, Pittsburgh.

E. M. Griffith of the C. U. Burt & E. M. Griffith Company, a large machinery dealer in England, and James Lang of John Lang & Son, Scotland, both of whom have been visiting machinery houses here for some time, sailed for Europe on Saturday.

D. J. Carson, who has been with the American Brake Shoe & Foundry Company for the past two years, in charge of its New York office, has been appointed manager of the American Malleables Company, effective June 1.

Marshall Cushing, who has for some years been secretary of the National Association of Manufacturers, has resigned that connection, effective June 1. The resignation is stated to be the result of friction in the Board of Directors on the tariff question. George S. Boudinot, chief clerk and cashier of the association, becomes acting secretary until the vacancy is regularly filled.

Henry C. Hunter, secretary of the New York branch of the National Metal Trades Association, has sailed for Europe and will be absent five or six weeks.

Benjamin Hirsch, senior member of Aaron Hirsch & Son, Halberstadt, Germany, is in this country accompanied by Gabriel Hirsch, also a member of the firm. They have been here since June 1, and expect to return to Europe about June 18. L. Vogelstein & Co., 100 Broadway, New York, are American representatives of the firm.

G. L. Peck, general manager of the Pennsylvania Lines West of Pittsburgh, sails for Europe this week. Mr. Peck is chairman of the American Railway Association's Committee on Rails, which was instructed at the Chicago convention of the association recently to confer with the steel rail manufacturers on proposed changes in rail specifications.

A Comparatively Cheap Explosive.—An explosive costing only one-tenth as much as dynamite was experimented with in the construction of the Simplon tunnel. It was made by soaking meal or powdered charcoal in liquid air or liquid oxygen, the powdered carbon being first packed into a case made of stout paper and covered with an asbestos wad, through which passed a paper tube to the bottom of the cartridge. Just before firing, the liquid air was poured into the tube, and the firing was as usual by means of a fulminate cap. As the liquid air gradually evaporates the period between filling and firing was limited to below 10 min. A misfire was not dangerous, because at the end of half an hour the liquid

had entirely disappeared and, by waiting that long, the cartridge could again be handled with perfect safety. Its use had to be abandoned in the tunnel on account of the quantities of carbon monoxide which it produced in the constricted space.

OBITUARY.

ALBERT PAUL SIMLEY of the Sibley Machine Tool Company, South Bend, Ind., died May 25.

ALFRED LEE TAYLOR, who was one of the founders of the town of Anniston, Ala., died of Bright's disease June 2 at the Waldorf-Astoria, New York, aged 73 years. He was born in Norwich, Conn. After his graduation from Harvard College he entered the employ of the Pennsylvania Railroad Company, where he remained for many years, finally joining his father in building the Macon & Western Railroad. Then he became general manager of the Philadelphia & Erie, and at the close of the war was chosen as vice-president and general manager of the South Carolina Railroad, running between Columbia and Charleston. He again joined his father in business in 1869 in manufacturing pig iron in northern Alabama. He leaves a widow and two daughters.

JOSIAH F. DAY, who was for many years New York manager for the Studebaker Bros. Mfg. Company, died June 3, aged 79 years. He was a native of Stubenville, Ohio, and for 30 years previous to his coming to New York was in the hardware business in Pittsburgh, Pa. About 10 years ago he patented a dump wagon, used by contractors, and since that time had been interested in the manufacture of his patent. He leaves a married daughter.

The Shelby Iron Company's Report

The annual report of President T. G. Bush of the Shelby Iron Company, Birmingham, Ala., covering operations for the fiscal year ending March 31, 1907, shows rather good net earnings. The profits of the year amounted to \$60,802.56, from which deductions were made amounting to \$3,536.73 for various items of expense, leaving the net profit \$57,265.83. A dividend of 5 per cent. was declared, payable May 15, amounting to \$50,000. The balance carried forward to the present year was \$251,404.32. According to the company's regular custom, 25 cents per ton of iron made was charged into the cost of iron for extraordinary or prospective repairs. This account showed at the close of the year a credit of \$8,808.98. The extraordinary repairs which were made to the furnaces were charged against this account. The company made during the year 13,108.25 gross tons of pig iron and had on hand at the close of the year 1,105.75 tons, with orders for future delivery amounting to 1450 tons.

The company operated one furnace in the manufacture of charcoal iron for six and one-half months, and one furnace in the manufacture of coke iron for about two and one-half months during the fiscal year. This was owing to the fact that the supply of charcoal had been considerably reduced. The conditions attending the supply of timber and labor on the part of charcoal contractors caused practically all of them to forfeit their contracts, and consequently the company was compelled to begin anew the charcoal business and to organize its own coaling so that at the present time practically all of the charcoal used is manufactured directly by the company. The cost of charcoal is materially increased on account of the enhanced value of the wood and higher cost of labor, and it is expected that it will continue relatively high in the future. The report states that the company is at a great disadvantage in operating one of its furnaces in the manufacture of coke iron on account of the small size of the furnace and the condition of the stoves which furnish but a small degree of heat. It is believed that with the present iron market the company will be able to operate one furnace on coke iron with profit and will show that it will likely be profitable to make provision at some time in the near future for a furnace suitable for manufacturing coke iron on a comparatively economical basis.

NEWS OF THE WORKS.

Iron and Steel.

At blast furnace No. 1 of the Shelby Iron Company, Shelby, Ala., which has been running on coke iron recently, a breakout occurred on May 17, resulting in the burning of all the sheds of that furnace, also in damage to the engine house and the engines. Repairs were made to the engines so that the No. 2 furnace, which is making charcoal iron, was able to resume in two days. No. 1 furnace will probably be out of blast for 30 days.

The Pennsylvania Steel Company tapped the first of the new 75-ton open hearth furnaces at Steelton, Pa., on May 27. The other four furnaces are being completed as rapidly as possible.

General Machinery.

The Canada Forge Company, Welland, Ont., has its new plant in full operation, producing light and heavy forgings.

The Royden Marble Machinery Company, Metropolitan Life Building, New York, has incorporated to place on the market new stoneworking machinery. J. Royden Peirce is president and E. Cuthbert Hamilton secretary and treasurer.

The business of Edward A. Menczer, Dallas, Texas, has been incorporated with a capital stock of \$10,000 as the Edward A. Menczer Machine Company. The company will continue the manufacture of special machinery and do general machine work. Edward A. Menczer is president; J. B. Moses, vice-president, and Walter Gage, secretary. These officers with T. W. Burns constitute the Board of Directors.

The Phoenix Iron Works Company, whose address was erroneously stated in these columns last week, is located at Boulder, Colo. The company intends to install an automobile garage, and will be in the market for drill press, radial drill, lathes, &c.

The National Machine & Construction Company, Kansas City, Mo., has been incorporated with a capital of \$6000, and will make a specialty of the construction and installation of power plants. A machine shop has been fitted up and will be operated in connection with the business. Frank Schmidt is president and general manager; E. E. Billow, vice-president, and W. L. Holzbaun, secretary and treasurer.

Contracts have been let and building operations are well under way for the construction of a large addition to the plant of the Union Steam Pump Company, Battle Creek, Mich. The new building will be of brick, one and two stories high, 115 x 244 ft., and will be fitted throughout with modern machinery.

The Lehigh Valley Railroad intends to make important improvements to its terminal at Buffalo, N. Y., and yards at Depew, Manchester and East Waverly, N. Y., at an estimated cost of \$2,850,000. At Buffalo, the ore handling facilities will be increased by the installation of three unloading machines and other equipment. At Manchester and East Waverly about \$750,000 will be spent on new classification yards. Contracts have been let for a part of the improvements.

The Columbus Forge & Iron Company, Columbus, Ohio, will increase its capital stock from \$125,000 to \$200,000, consisting of \$100,000 6 per cent. preferred and a like amount common. This action was authorized by the stockholders at a recent meeting.

Power Plant Equipment.

White Star continuous oiling systems, which mechanically keep engine bearings supplied with a steady stream of pure lubricating oil, have recently been installed by the Pittsburgh Gage & Supply Company, Pittsburgh, Pa., in the power plants of the following companies: The Windsor, Essex & L. S. Rapid Railroad, Kingsville, Ont.; Buick Motor Company, Flint, Mich.; Warwick Mills, Centerville, R. I.; Fitchburg Yarn Company, Fitchburg, Mass.; Kaufmann Bros., Cincinnati, Ohio; Washington Electric L. & P. Company, Washington, Pa.; Federal Furnace Company, Chicago, Ill.; American Wood Working Machine Company, Rochester, N. Y.; Utica Knitting Company, Utica, N. Y.; Harrisburg Light, Heat & Power Company, Harrisburg, Pa.; Baldwin Locomotive Works, Philadelphia, Pa.; Ames Iron Works, Philadelphia, Pa.; R. A. Long Building, Kansas City, Mo.; Reo Motor Car Company, Lansing, Mich.

The Kneeland Mfg. Company, Lansing, Mich., has purchased a gasoline engine plant, 60 x 200 ft., with a well equipped foundry, at Battle Creek, Mich., where it will manufacture marine and stationary engines. The new plant, which has just been placed in operation, will be conducted by a new company officered by the following officers of the Kneeland Mfg. Company: F. W. Kneeland, president; J. Q. Adams, vice-president; E. C. Barnum, secretary; E. J. Kneeland, treasurer and manager, and E. G. Satterlee, superintendent. The company maintains agencies in 22 States, British Columbia, Holland and Finland.

The Standard Safety Boiler Company, Fort Wayne, Ind., has been incorporated with a capital stock of \$50,000, by Samuel K. Gregg, Charles E. Colerick and Walter M. Gregg. The company makes horizontal and vertical water tube boilers.

Foundries.

The Stuttle Brass Mfg. Company, Batavia, Ill., maker of brass, bronze, aluminum and hard iron castings, has incorpo-

rated with a capital of \$2500, and has taken over the business heretofore operated by Henry Stuttle. The company occupies a new factory building recently completed. Henry Stuttle is president and Carl O. Klingholz secretary and treasurer.

The Bay View Foundry Company, Sandusky, Ohio, has outgrown its present quarters, and has asked the city council for a new site on which to erect a new plant.

The West Steel & Iron Castings Company, Cleveland, Ohio, which started a new plant on East Seventy-ninth street a few months ago, has increased its capital stock from \$30,000 to \$60,000. No extensions are planned at present.

The new plant being built by the Vincennes Pipe & Casting Company, Vincennes, Ind., will consist of a foundry, 50 x 200 ft.; cleaning room, 30 x 60 ft.; machine shop, 30 x 60 ft., and will have an initial daily capacity of 10 tons of iron. The output will be cast iron soil pipe and fittings and general castings.

The New Process Steel Company, Marshall, Mich., which was organized less than a year ago, is having such a large demand for its high grade crucible steel castings for automobiles, gas engines and machinery that it has been found necessary to enlarge its plant. Contract has been let for an addition, 50 x 123 ft., which will be used for cleaning and shipping rooms, core room, pattern storage, carpenter shop, &c., giving the entire floor space of the present building, 60 x 123 ft., for foundry purposes. S. F. Dobbins is president; F. A. Stuart, vice-president; F. S. Deuel, treasurer, and S. C. French, secretary and manager.

The Buffalo Crucible Casting Company, Buffalo, N. Y., having recently increased its facilities, is now in a position to make prompt deliveries, and can commence molding on receipt of patterns. The company makes high grade crucible steel castings from 1 to 1000 lb., which are particularly adapted for use where high tensile strength and long wearing qualities are desired, as in crank shafts, connecting rod gears, die blocks, automobile parts, &c. They are smooth, soft and easily machined.

The recent fire at the plant of the Littlefield Stove Company, Albany, N. Y., completely destroyed the foundry and storehouse, the manufacturing and other buildings being saved. Plans are now being prepared for rebuilding the structures which were burned. The present buildings are fully equipped, and the company desires to contract for a large quantity of castings.

Fires.

Fire destroyed the plant of the General Drop Forging Company at Elmwood avenue and New York Central Belt Line tracks, Buffalo, N. Y., May 27. The loss is estimated at \$50,000, of which \$8000 is on the building and the remainder on machinery. Twenty forging machines were rendered useless.

Hardware.

The De Witt Wire Cloth Company, 299 Broadway, New York, with mills at Belleville, N. J., and Philadelphia, Pa., is increasing its plant for the manufacture of bronze wire window screen cloth, copper and galvanized, also its wire rope and cord department, including bronze and galvanized tiller ropes and sash cords and the wire cord for curtain cable.

The Hudson Mfg. Company, Hudson, Mich., manufacturer of Hudson bicycles and accessories, advises us that its bookings are fully three times as heavy as at the corresponding time last year, and that its shipments up to this time have been much heavier than for the same season a year ago.

The Ohio Cooker Company, Toledo, Ohio, is meeting with much success in introducing its steam cookers and stoves in countries like Cuba, where cooking methods have been quite primitive. The company is now placing about 50,000 cookers yearly in the United States. The cookers are referred to as being indorsed by many of the best physicians in the country.

The Clarkson Pump & Cylinder Company, Tenino, Wash., has been organized to manufacture pumps and pump supplies. The officers are Fred Spencer, president; J. W. Van Norman, treasurer; A. J. Rockhold, secretary; W. R. Clarkson, manager.

The Casterline Cutlery Company, with offices at 214-215 Commercial Block, Portland, Ore., is considering a proposition for the removal of its factory from that city to San Diego, Cal. The company manufactures a line of cutlery and edge tools, tempered by a new process, which it is claimed produces a steel of extraordinary hardness. The tempering process consists in dipping the steel into a chemical fluid, the composition of which is the invention of B. J. Casterline.

The Turner & Fish Company, manufacturer of automobile steel stampings, has changed its name to the Indestructible Steel Wheel Company, and has established new offices and salesroom at 1303 Michigan avenue, Chicago. Added capital has been enlisted in the business, and the company is building a large brick and stone plant at Lebanon, Ind., which it is expected will be completed by July 1. A line of pressed steel wheels for automobiles comprises the company's chief product.

The Independent Tack Company, with \$50,000 capital stock, has been organized at Cuyahoga Falls, Ohio, for the manufacture of double pointed tacks and staples. The company has all the machinery bought for its plant. The incorporators are E. O. Grose, C. D. Keeney, Fred R. Post, Phoebe F. Post and Rose A. Grose. The company will use a new tack machine recently in-

vented by Mr. Grose. Several of the machines have been built at the plant of the Turner, Vaughn & Taylor Company, Cuyahoga Falls.

The Standard Foundry & Mfg. Company, Cleveland, Ohio, is having plans prepared for an addition to its plant, to be used as a rivet shop. The building will be about 60 x 60 ft.

The Neverslip Mfg. Company, maker of horseshoes, New Brunswick, N. J., is now occupying and fully operating its additional new plant recently purchased, the building being 75 x 240 ft., two stories high. The company is also building a plant at Montreal, Canada, which it expects to complete by July 1. The Canadian plant will be 75 x 240 ft., part one story and part two stories. Besides these plants the company has a third at Catasauqua, Pa.

The Capitol Lock Nut & Washer Company, Columbus, Ohio, at its first annual meeting, held on the 9th ult., elected the following directors: A. M. Gaines, L. R. Ayers, J. Z. Krumm, J. C. Rogers, F. C. Hubbard, H. B. Hutchinson, W. E. Meade, C. F. Dickinson and Andrew Dobbie. Mr. Dobbie succeeded O. A. Glock and Mr. Dickinson takes the place of T. H. Rhine of Denver, Colo., who resigned some time since. The company manufactures lock nuts, track bolts, nuts and washers, and although in operation less than a year has made such progress as to warrant the enlargement of the present plant, requiring considerable new machinery and equipment, which will be ordered at once.

The Hoopeston Horse Nail Company, Hoopeston, Ill., has received a communication from a British syndicate asking that the company locate a plant in England for the manufacture of horse nails under the process now in use in Hoopeston. The offer is, we understand, a flattering one and the company is giving it serious consideration.

The Potts Mfg. Company, which was conducted as a partnership for many years, was incorporated in March last under the same style, J. R. Potts being elected secretary and treasurer. The company manufactures iron fencing, grilles and fire escapes and also does general machine work. Business is referred to as excellent, with orders that tax the capacity of the plant.

The Henry Cheney Hammer Company, Little Falls, N. Y., has just completed a three-story addition to its factory plant, which will give it an increased production of about 100 dozen handled hammers per day.

The Canedy-Otto Mfg. Company, Chicago Heights, Ill., advises us that it is building an addition to its factory necessitated by the increased demand for its goods.

The Winona Wagon Company, Winona, Minn., maker of Rushford and Winona wagons, has improved its plant during the past year by the installation of three 180-hp. internally fired boilers. It has also equipped its factory with a complete sprinkler system. The company is pushing especially its Winona wagon, with ironclad hubs and outer bearing axles, for which it is enjoying a growing demand.

The Rome Mfg. Company, Rome, N. Y., maker of nickel plated copper ware, has just erected a new warehouse, 41 x 246 ft. on the ground and two stories high, which will greatly facilitate the handling of its product.

The Niagara Oil Stone Company has been incorporated at North Tonawanda, N. Y., with a capital stock of \$25,000, and will manufacture hones, oil stones, &c. F. C. Allen, Duncan Sinclair and J. P. Lindsay, North Tonawanda, are the directors.

The Wilkinson Mfg. Company, Binghamton, N. Y., maker of children's express wagons, automobiles, velocipedes and sleds, folding tables, &c., has under construction an entirely new factory, 110 x 160 ft. in size and three stories high. The building is of brick, modern mill construction, and furnished with a new steam plant. In addition to this the company is installing new dry kilns and has acquired some adjoining property, affording needed space for handling the increasing production demanded by its trade.

Miscellaneous.

The Monarch Mfg. Company, Columbus, Ohio, has completed a new brass foundry, which is now in operation. The company now has facilities for turning out over 100 water motors a day in addition to other specialties.

The Bohnert Mfg. Company, Paris, Ill., recently incorporated with a capital of \$50,000, will engage in the manufacture of galvanized eave troughs, corrugated and plain conductor pipe and cresting ridge roll. A jobbing business in sheet iron and tin plate will also be done.

The Holscher Electric Mfg. Company, Warren, Ohio, will soon begin the erection of a two-story addition, 36 x 60 ft., and will start the manufacture of lamps.

J. Warner, president of the Empire Iron & Steel Company, Niles, Ohio, and associates have purchased a controlling interest in the Eller Mfg. Company, Canton, Ohio, which has been in existence over 20 years and is a large user of sheets. The business will be continued as heretofore, and the sheets will be supplied by the Empire Iron & Steel Company.

The Panama Portland Cement & Development Company, Batavia, N. Y., has been incorporated, with a capital stock of \$1,000,000, for the manufacture of Portland cement. The company has acquired 200 acres of land on the Tombigbee River

in Alabama, where a plant with a capacity of 1000 barrels a day will be erected and equipped with modern machinery. Much of the production will be shipped to Panama. Those interested in the enterprise are Charles De Money, Charles J. De Money, William A. Burmeister and James G. R. Cole of Buffalo, C. Orvis Brown and Clarence C. Godfrey, Batavia, and Ralph R. Supton, Wilmington, Del. Charles R. De Money is president; James G. R. Cole, vice-president; Clarence C. Godfrey, secretary; C. Orvis Brown, treasurer, and William E. Webster, attorney.

The Jones & Laughlin New Erecting Shop.

The Jones & Laughlin Steel Company, Pittsburgh, has secured a long lease on the property formerly occupied by the Keystone Rolling Mill Company on Second avenue, Pittsburgh, containing about 5 acres, on which it will build large erecting shops for fabricating material. At present two erecting shops on the South Side, Pittsburgh, are being operated by the company, but these will be moved to the new location and, in addition, one other large erecting shop will be built, also a templet shop and a new office building. All these structures will be of steel and will be built by the company. The new shops will be equipped with the most modern tools, consisting of drill presses, reamers, punches, angle shears, plate shears, &c. All machinery will be electrically driven, the contract for the electric equipment having been placed with the Westinghouse Electric & Mfg. Company.

These new erecting shops will give the Jones & Laughlin Steel Company an increase of about 50 per cent. in capacity for fabricating, and in addition will allow large stocks of structural steel in its various forms to be carried to supply local trade. In fact, the company expects to be able, when the new shops are finished, to furnish steel for one or two stories of almost any size of building promptly from stock. The ground now occupied by the two erecting shops on the South Side will be utilized for additional railroad tracks, and will increase the shipping facilities of the Nos. 12 and 14 structural mills, which are now badly hampered in this respect. Work on the new buildings will be pushed as fast as possible and they are expected to be ready within the next two or three months. The office building to be erected will also contain drawing rooms, and the force of draftsmen now located on the South Side will be moved to the new structure.

Western Boiler and Machinery Manufacturers Oppose Freight Increase.

CINCINNATI, OHIO, June 4, 1907.—(By Telegraph).—A conference of the boiler and machinery manufacturers of the Middle West was held to-day at the Sinton Hotel in this city to discuss the freight classifications adopted by the official Transportation Committee of the Railroad Associations. These were scheduled to take effect July 1, but have been postponed to August 1.

The meeting was called by J. G. McDowell of the Atlas Engine Works, Indianapolis. Inasmuch as it is the sense of the manufacturers that the proposed changes will effect a material hardship measures are to be taken to protest against departing from the present classifications of freight. The point particularly at issue is the change from a minimum flat carload of 24,000 lb. to 30,000 lb. for a 40-ft. car, the size most commonly in use. The action of the meeting will be referred first to the Central Traffic Association and through it to the Classification Committee.

The Pittsburgh Steel Construction Company, Lewis Building, Pittsburgh, has received a contract from the Keystone Driller Company, Beaver Falls, Pa., for a steel foundry building, 110 x 300 ft., to be equipped with a steel charging floor.

The number of Pennsylvania Railroad stockholders entitled to receive the May dividend is 45,496. This is the highest number of stockholders in the company's history to whom a dividend has been paid. Of this number, 21,028 are women.

The Iron and Metal Trades

The purchase by the Lukens Iron & Steel Company of the Oriskany mines and the three blast furnaces in Virginia is regarded as significant, following as it does the building of a blast furnace at Buffalo on the part of the Wickwire Company. Both are makers of Steel whose experience in drawing upon the open market for Basic Pig Iron during the past six months seems to have created a desire to become independent, as a matter of safety. It is understood that the Lukens Company attached special importance to the acquisition of a reliable Ore property.

The Pig Iron markets throughout the country have been very quiet. The furnaces are sold far ahead and show little disposition to press Iron for more distant delivery, while many buyers have little confidence in the market, in view of the general business situation and the financial outlook. The feeling is prevalent, however, that the present level of prices will be well maintained until the end of the summer. The English markets are said to have been weakened by reports of a decline of \$1 per ton on the price of Pig Iron on this side. There is nothing in conditions here to justify such a report. Foreign Iron continues to come in, but we cannot learn that any fresh commitments have been made lately. It is believed, however, that Foreign Iron will come forward for three months more.

The leading interest has bought 4000 tons of Low Phosphorus Iron in addition to 6000 tons taken last week.

Steel Rail sales during the week include 40,000 tons for the Chicago & Northwestern, 7000 tons for the Arkansas, Louisiana & Gulf, 6000 tons for the Wisconsin Central and 3000 tons for the Pennsylvania. The Atchison requirements will probably aggregate about 50,000 tons, of which a considerable part will probably be rolled east of the Allegheny Mountains. The Seaboard Railroad is expected to place soon quite a heavy tonnage for the latter part of this year and for next year.

There have been some renewals of contracts for Steel Billets in the East in lots of 2000 and 5000 tons—an encouraging fact, since the volume of business which has been coming to Eastern Steel mills has been rather light for some time past.

While Sheared Plates are in heavy demand, the market for Universal Plates is not so active, and quite early deliveries can be made. The Sheet mills are catching up with their deliveries. The Tin Plate trade has quieted down. The mills, however, are full of business for a long period, and it remains to be seen whether the probable loss of tonnage through poor fruit crops will not be made up in other directions.

The demand for Steel Bars, notably in the West, is still very heavy. The great majority of the larger buyers of Cotton Ties have now covered their requirements for the next season. The makers of Merchant Pipe are not succeeding well in catching up with their deliveries.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

		At date, one week, one month and one year previous.			
		June 5, 1907.	May 29, 1907.	May 8, 1907.	June 6, 1906.
PIG IRON, Per Gross Ton:					
Foundry No. 2, Standard, Philadelphia.....	\$25.50	\$25.50	\$25.50	\$18.50	
Foundry No. 2, Southern, Cincinnati.....	24.25	24.25	24.25	16.75	
Foundry No. 2, Local, Chicago.....	26.50	26.50	26.50	18.50	
Bessemer, Pittsburgh.....	24.40	24.35	23.85	18.10	
Gray Forge, Pittsburgh.....	23.15	22.90	22.35	16.35	
Lake Superior Charcoal, Chicago.....	27.50	27.50	27.50	19.00	
BILLETS, &c., Per Gross Ton:					
Bessemer Billets, Pittsburgh....	30.00	30.00	30.50	26.00	
Forging Billets, Pittsburgh....	35.00	35.00	36.00	32.00	
Open Hearth Billets, Phila.....	32.50	32.50	32.50	29.00	
Wire Rods, Pittsburgh.....	37.00	37.00	37.00	34.00	
Steel Rails, Heavy, Eastern Mill.....	28.00	28.00	28.00	28.00	
OLD MATERIAL, Per Gross Ton:					
Steel Rails, Melting, Chicago....	18.50	18.50	18.00	14.00	
Steel Rails, Melting, Phila.....	20.00	19.50	19.50	16.25	
Iron Rails, Chicago.....	24.50	24.50	24.50	21.25	
Iron Rails, Philadelphia.....	27.50	27.50	27.25	21.00	
Car Wheels, Chicago.....	25.50	25.50	25.00	18.00	
Car Wheels, Philadelphia.....	25.50	25.50	24.00	16.50	
Heavy Steel Scrap, Pittsburgh....	18.50	18.50	18.00	15.75	
Heavy Steel Scrap, Chicago.....	16.00	16.00	15.50	13.50	
Heavy Steel Scrap, Philadelphia.....	19.00	19.00	19.00	15.75	
FINISHED IRON AND STEEL, Per Pound:					
Refined Iron Bars, Philadelphia.....	1.83½	1.83½	1.83½	1.63½	
Common Iron Bars, Chicago.....	1.78	1.76½	1.76½	1.66½	
Common Iron Bars, Pittsburgh....	1.75	1.75	1.80	1.50	
Steel Bars, Tidewater, New York.....	1.84½	1.84½	1.84½	1.64½	
Steel Bars, Pittsburgh.....	1.60	1.60	1.60	1.50	
Tank Plates, Tidewater, New York.....	1.84½	1.84½	1.84½	1.74½	
Tank Plates, Pittsburgh.....	1.70	1.70	1.70	1.60	
Beams, Tidewater, New York....	1.84½	1.84½	1.84½	1.84½	
Beams, Pittsburgh.....	1.70	1.70	1.70	1.70	
Angles, Tidewater, New York....	1.84½	1.84½	1.84½	1.84½	
Angles, Pittsburgh.....	1.70	1.70	1.70	1.70	
Skelp, Grooved Steel, Pittsburgh.....	1.85	1.85	1.85	1.57½	
Skelp, Sheared Steel, Pittsburgh.....	1.90	1.90	1.90	1.60	
SHEETS, NAILS AND WIRE, Per Pound:					
Sheets, No. 27, Pittsburgh.....	2.50	2.50	2.50	2.40	
Wire Nails, Pittsburgh.....	2.00	2.00	2.00	1.85	
Cut Nails, Pittsburgh.....	2.05	2.05	2.05	1.75	
Barb Wire, Galv., Pittsburgh....	2.45	2.45	2.45	2.30	
METALS, Per Pound:					
Lake Copper, New York.....	24.25	24.25	24.87½	18.75	
Electrolytic Copper, New York....	23.37½	23.50	24.37½	18.62½	
Spelter, New York.....	6.50	6.45	6.55	6.00	
Spelter, St. Louis.....	6.40	6.30	6.40	5.90	
Lead, New York.....	5.75	6.00	6.00	6.00	
Lead, St. Louis.....	5.65	5.92½	5.92½	5.90	
Tin, New York.....	41.50	42.50	42.25	39.65	
Antimony, Hallett, New York....	17.00	17.00	20.50	26.00	
Nickel, New York.....	45.00	45.00	45.00	40.00	
Tin Plate, 100 lb., New York....	\$4.09	\$4.09	\$4.09	\$3.94	

Chicago.

FISHER BUILDING, June 5, 1907.—(By Telegraph.)

A general survey of the market seems to indicate that while specifications on contracts are not delinquent in any line, there is on the whole less new business developing. That this is in part due to abnormal conditions created by the congestion of productive capacities can scarcely be doubted. New orders are, however, still plentiful enough to prevent a rapid return to normally prompt deliveries. In anticipation of their Rail requirements for the coming year Western railroads are still placing orders, though the total tonnage so far booked is small as compared with what is regarded as their probable needs. Two orders, aggregating 44,600 tons, represent the past week's business in Steam Rails, both being taken by the Illinois Steel Company. Plans for three local building projects, including structures for the American Tobacco Company, Pullman Company and the Corn Products Company, which were figured on earlier in the season, are still held in abeyance, the last named being indefinitely postponed. Over 17,000 tons of Structural Material are involved in these buildings. Aside from these, the progress of contract closures for bridges and buildings is satisfactory. An extremely active movement in forward contracting for Steel Bars has resulted in the placing within the past 60 days of over 100,000 tons by the leading Western interest. Western pipe lines assuring large Plate tonnages are talked of, but no orders have materialized. The only noteworthy feature of the Pig Iron market is its exceptional quietness. Buyers and sellers alike seem quite indifferent, and as a result there is but little doing, though prices remain firm. Scrap material of nearly all grades is in good demand, with a marked scarcity of melting stock.

Pig Iron.—An exceedingly quiet and featureless market characterizes the situation in Pig Iron. Sales for the past week are probably fewer, and the tonnage involved lighter, than for any preceding week of the year. A few scattering car lots of spot Iron, representing the emergency requirements of small melters, are being moved, but the aggregate tonnage of such business is of trivial importance. Though \$23, Birmingham, is generally asked for prompt No. 2 Foundry Iron, \$22.50 is being quoted by at least one interest and represents the inside price for spot and early deliveries. The utter lack of buyers' interest in forward deliveries is demonstrated by an absence of inquiries indicating a purpose to place orders for future requirements. An inquiry recently in the market from a large consumer for 5000 tons for last quarter delivery, meeting no tempting concessions, has been withdrawn. It is believed that melters are generally well covered for prospective needs through the third quarter, and few inquiries or transactions for that period are reported. The few orders that have been booked are mainly for fourth quarter. But little disposition toward the anticipation of next year's needs is shown by consumers, the only deals of this character reported being confined to two small orders, amounting in all to less than 1000 tons, taken for the first quarter at \$18.50. While the cessation of buying has not so far affected the firmness of prices, it has undoubtedly been influential in checking the tendency toward further advances. It is understood that practically all of the 5000-ton cargo of Middlesbrough Iron noted in last week's report has been sold for delivery on arrival the latter part of July. Of the small amount of tonnage placed last week for forward delivery, the greater part was taken by Northern furnaces. Northern No. 2 Foundry for shipment through the last half is quoted at \$25.50, Chicago. The following prices are for June delivery, f.o.b. Chicago:

Lake Superior Charcoal.....	\$27.50 to \$28.00
Northern Coke Foundry, No. 1.....	27.00 to 27.50
Northern Coke Foundry, No. 2.....	26.50 to 27.00
Northern Coke Foundry, No. 3.....	26.00 to 26.50
Northern Scotch, No. 1.....	27.00 to 27.50
Ohio Strong Softeners, No. 1.....	26.50 to 27.00
Ohio Strong Softeners, No. 2.....	26.00 to 26.50
Southern Coke, No. 1.....	27.35 to 27.85
Southern Coke, No. 2.....	26.85 to 27.35
Southern Coke, No. 3.....	26.35 to 26.85
Southern Coke, No. 4.....	25.85 to 26.35
Southern Coke, No. 1 Soft.....	27.35 to 27.85
Southern Coke, No. 2 Soft.....	26.85 to 27.35
Southern Gray Forge.....	25.35 to 25.85
Southern Mottled.....	25.35 to 25.85
Malleable Bessemer.....	26.50 to 27.00
Standard Bessemer.....	25.30 to 25.80
Jackson Co. and Kentucky Silvery, 6 %	31.30 to 31.80
Jackson Co. and Kentucky Silvery, 8 %	32.30 to 32.80
Jackson Co. and Kentucky Silvery, 10 %	33.30 to 33.80

(By Mail.)

Billets and Rods.—Scarcity of Rods prevents active movement in the open market. Makers are supplying the normal requirements of their regular trade, but have no surplus tonnage to offer. For current transactions prices range from \$37 to \$38, Pittsburgh. A recent inquiry for 5000 tons of Forging Billets from a local consumer failed to elicit required price concessions in this market, and so far as can be learned the order has not been placed. The sale of one round tonnage lot is reported. From \$36 to \$38 is asked for Forging Billets, the latter price applying to small lots for prompt delivery.

Rails and Track Supplies.—The tonnage of Steam Rail purchases is growing slowly, and was this week increased by two sales, one of 40,000 and the other of 4600 tons to Western roads, both being made by the Illinois Steel Company. No sales or inquiries are reported for Traction Rails from interurban lines, but a number of moderate tonnage lots of grooved sections for street railroad extensions have been placed. Some business in Light Rails for forward delivery is reported, and the demand for Track Supplies is fairly active. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c. to 1.95c.; Spikes, 2.35c. to 2.45c., according to delivery; Track Bolts, 2.65c. to 2.75c., base. Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$35; 25-lb., \$36; 20-lb., \$37; 16-lb., \$38; 12-lb., \$39, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—Mill capacities are well engaged and specifications are coming forward without restraint. The new business arising from building and bridge work continues to supply a considerable tonnage. A contract for 1900 tons to be used for viaducts and bridges was placed by the Chicago, Milwaukee & St. Paul, and the Wisconsin Bridge Company secured the contract for the Chicago & Northwestern bridge at Clinton, Iowa, 4500 tons. Of the inquiries in, 800 tons are being figured on for an addition to the State Capitol building, Madison, Wis., and 1000 tons for the Southern California Cement Company, Riverside, Cal. Besides these there are inquiries from a number of brewery interests, which amount in the aggregate to a tonnage of good size. Prices from store are quoted without change at 2.05c. to 2.10c., and mill prices, at Chicago, are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.;

Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—Evidence of any material relief from the congestion that has for months past made mill deliveries extremely slow and uncertain is still lacking. Though in lessened volume, new business is being added to the tonnage booked, and specifications on contracts are plentiful. The demand on store stocks is abnormal and prices for prompt shipment are from \$1 to \$3 a ton in excess of regular quotations. We quote for future delivery as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in., up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—While the demand for Sheets, both Black and Galvanized, is good, the difficulty in getting deliveries with reasonable promptness is but slightly relieved. Western mills, though well supplied with forward bookings, are in somewhat better position as respects deliveries than the principal makers; but at that, on the general run of orders, they are weeks behind. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c. Sheets from store: Blue Annealed, No. 10, 2.50c.; No. 12, 2.55c.; No. 14, 2.60c.; No. 16, 2.70c.; Box Annealed, Nos. 18 to 21, 2.80c.; Nos. 22 to 24, 2.85c.; No. 26, 2.90c.; No. 27, 2.95c.; No. 28, 3.05c.; No. 30, 3.45c.; Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—Steel Bars continue to be one of the most active lines in the list of finished materials. Over 100,000 tons have been booked by the leading Western interest within the past 60 days. With the close of the 1907 season yet practically a month away, specifications on implement makers' contracts for that period are not only all in hand, but in many instances contracts have been overspecified. Nearly all the large interests have covered their requirements for the ensuing season, but many orders for moderate tonnage lots are being booked. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.78c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—The demand for Pipe continues exceptionally strong, and on top of the large amount of business booked ahead a good volume of new orders is constantly coming forward. There is but little encouragement offered for the expectation of better deliveries in the near future. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to 1 point on the base. From store in small lots, Chicago jobbers quote 68 per cent. on Black Steel Pipe, ¾ to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—In common with other tubular goods, the demand for both Merchant and Locomotive Tubes is exceptionally strong. Though the congestion in these departments is not so acute as in Pipe, mill shipments are extremely slow. Mill quotations for future delivery on base sizes are as follows: 2¾ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.....	35	35	35
1¾ to 2¼ in.....	50	35	35
2½ in.....	52½	35	35
2¾ to 5 in.....	60	47½	47½
6 in. and larger.....	50	35	..

Merchant Steel.—More than ordinary activity is noticed in Smooth Machinery Steel Tire and specialties, the movement being due to the buying by implement makers, who are contracting for requirements of the coming season. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish, up to 1½ x ½ in., 1.93c.; Iron Finish, 1½ x ½ in. and larger, 1.78c., base; Channels for solid rubber Tires, ¾ to 1 in., 2.28c., and 1½-in. and larger,

2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46 $\frac{1}{2}$ c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7 $\frac{1}{4}$ c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, base territory.

Cast Iron Pipe.—No new lettings of conspicuous tonnage have appeared to enliven the situation, nor are there any in immediate prospect. Routine orders for small lots, and mainly for the smaller sizes, aggregate a fairly good tonnage. There is no doubt that the high price of Pig Iron has caused the postponement of many important purchases, and these will, in all probability, now be deferred until next year. We quote per net ton, Chicago, as follows: Water Pipe, 4-in., \$38 to \$39; 6 to 12 in., \$37 to \$38; 16-in. and up, \$36 to \$37, with \$1 extra for Gas Pipe.

Coke.—Moderate demand and an unusually heavy output have operated to soften prices. While \$3.25 is generally quoted for Connellsville 72-hr. Foundry Coke, sales for prompt delivery have been made as low as \$3, at oven.

Old Material.—Dealers frankly acknowledge their inability to solve the puzzle presented by present market conditions. While prices were confidently expected to sag, a surprising degree of strength has developed, and in consequence there is a scramble among some of the more confident interests to secure material to meet maturing contracts. Prices are firm on all grades. Cast and Melting Scrap are very scarce, and but little is coming in to replenish depleted stocks. The railroad offerings this week comprise 3525 tons from the Santa Fé and 745 tons from the Wisconsin Central. The following quotations are per gross ton, f.o.b. Chicago:

Old Iron Rails.....	\$24.50 to \$25.00
Old Steel Rails, rerolling.....	19.00 to 19.50
Old Steel Rails, less than 3 ft.....	18.50 to 19.50
Relaying Rail's, standard sections, subject to inspection.....	28.00 to 30.00
Old Car Wheels.....	25.50 to 26.00
Heavy Melting Steel Scrap.....	16.00 to 16.50
Frogs, Switches and Guards, cut apart.....	17.00 to 17.50
Mixed Steel.....	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates.....	\$19.00 to \$20.00
Iron Car Axles.....	26.00 to 26.50
Steel Car Axles.....	21.00 to 21.50
No. 1 Railroad Wrought.....	16.00 to 16.50
No. 2 Railroad Wrought.....	15.00 to 15.50
Railway Springs.....	15.50 to 16.00
Locomotive Tires, smooth.....	17.50 to 18.00
No. 1 Dealers' Forge.....	13.00 to 13.50
Mixed Busheling.....	12.00 to 12.50
Iron Axle Turnings.....	12.50 to 13.00
Soft Steel Axle Turnings.....	12.50 to 13.00
Machine Shop Turnings.....	12.50 to 13.00
Cast Borings.....	10.50 to 11.00
Mixed Borings, &c.....	10.50 to 11.00
No. 1 Mill.....	10.00 to 10.50
No. 2 Mill.....	9.00 to 9.50
No. 1 Rollers, cut to Sheets and Rings.....	11.50 to 12.00
No. 1 Cast Scrap.....	19.00 to 19.50
Stove Plate and Light Cast Scrap.....	15.50 to 16.00
Railroad Malleable.....	17.25 to 17.75
Agricultural Malleable.....	15.50 to 16.00
Pipe and Flues.....	12.25 to 12.75

Metals.—The demand for Copper is very quiet, though prices are firmly held. In anticipation of a possible reaction a little later, consumers are buying largely for immediate wants. Pig Tin has dropped back 2c. We quote as follows: Casting Copper, 25 $\frac{1}{2}$ c. to 26c.; Lake, 26c. to 26 $\frac{1}{2}$ c., in car lots for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{4}$ c. higher; Pig Tin, car lots, 43 $\frac{1}{4}$ c.; small lots, 43 $\frac{3}{4}$ c.; Lead, Desilverized, 6.50c. to 6.60c., for 50-ton lots; Corroding, 7.25c. to 7.35c., for 50-ton lots; in car lots, 2 $\frac{1}{4}$ c. per 100 lb. higher; Spelter, 6.87 $\frac{1}{2}$ c.; Cookson's Antimony, 27 $\frac{1}{2}$ c., and other grades, 26 $\frac{1}{2}$ c. to 27c.; Sheet Zinc is \$8.60 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 20 $\frac{1}{4}$ c.; Heavy Copper Wire, 21c.; Copper Bottoms, 19 $\frac{1}{4}$ c.; Copper Clips, 20c.; Red Brass, 19 $\frac{1}{4}$ c.; Red Brass Borings, 17 $\frac{1}{4}$ c.; Yellow Brass, 17c.; Yellow Brass Borings, 14 $\frac{1}{4}$ c.; Light Brass, 13c.; Lead Pipe, 5 $\frac{1}{4}$ c.; Tea Lead, 5.40c.; Zinc, 5.40c.; Pewter, No. 1, 30c.; Tin Foil, 35c.; Block Tin Pipe, 40c.

Birmingham.

BIRMINGHAM, ALA., June 1, 1907.

Pig Iron.—The market this week has been exceptionally quiet. Prices remain firm, however, and there is seemingly no desire on the part of the producers to book further orders for delivery during the last half of this year. For the first quarter of 1908 a certain amount of business is taken each week, but this is entirely from the smaller melters, and is not sufficient to excite more than passing comment. Prices are somewhat irregular, but the following is perhaps an average of what the different furnaces in the district are doing: Spot shipment, \$22.50 to \$23; June delivery, \$22 to \$22.50; third quarter, \$21 to \$21.50; last quarter, \$20 to \$20.50; first quarter, 1908, \$18.50. Charcoal Iron has been selling freely during the past two weeks at prices ranging from \$26 to \$27 per ton. The production of this grade of Iron in

Alabama is limited to two or three small stacks, and it is understood that the larger part of the output for this year is already under contract.

Cast Iron Pipe.—Lettings in which Southern manufacturers are interested will take place this week at Thomas and Clinton, Okla.; Nacogdoches, Texas, and Bristol, Tenn. These are for quantities ranging from 500 to 1000 tons for each place. In addition to this, two large lumber concerns are in the market for about 1000 tons each, contracts for which will be closed privately within the next few days. No large lettings are advertised for the near future, but orders for 500 tons and less are numerous, and after all this is the most desirable business from the manufacturers' point of view. On the more popular sizes the foundries here are not in position to promise delivery under three to four months. Prices on Water Pipe are unchanged, and are approximately as follows per net ton: 4 to 6 in., \$36; 8 to 12 in., \$34; over 12-in., average, \$31, with Gas Pipe \$1 extra per ton.

Old Material.—The Scrap market remains very much the same from week to week. The demand for all grades of Cast exceeds the supply, and it is with the greatest difficulty that dealers are securing sufficient to fill old contracts. Inquiries for Heavy Melting Steel have become more numerous during the past few days and a sharp advance in price is noted. The demand for Wrought Scrap is better than for some time, the mills buying in this market having exhausted old contracts. Dealers' quotations are approximately as follows, per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	18.50 to 19.00
Old Steel Axles.....	17.50 to 18.00
Old Car Wheels.....	20.50 to 21.00
No. 1 Railroad Wrought.....	18.50 to 19.00
No. 2 Railroad Wrought.....	13.00 to 13.50
No. 1 Country Wrought.....	13.00 to 13.50
No. 2 Country Wrought.....	12.00 to 12.50
Wrought Pipe and Flues.....	13.50 to 14.00
Railroad Malleable.....	14.00 to 14.50
No. 1 Steel.....	15.00 to 15.50
No. 1 Machinery Cast.....	16.50 to 17.00
Stove Plate and Light Cast.....	12.50 to 13.00
Cast Borings.....	8.50 to 9.00

Pittsburgh.

PARK BUILDING, June 5, 1907.—(By Telegraph.)

Pig Iron.—A meeting of the blast furnace operators of the Mahoning and Shenango valleys was held in Youngstown on Friday, May 31, to consider the demand of the blast furnace workers for an 8-hr. day and an advance in wages. This demand was made through Patrick McMahon, president of the Blast Furnace Workers' Union, but it was found that the majority of the men employed at the blast furnaces were not in sympathy with the movement, and further that the Blast Furnace Workers' Union had been repudiated by the Federation of Labor. It was decided not to pay any attention to the demand, as it is believed nothing will come of it. The Pig Iron market has been quiet. We note a sale of 2500 tons of Bessemer Iron for June delivery at \$23.50, Valley furnace, the Iron going to a Sharpsville interest. We quote Bessemer and Basic Iron for June and July delivery at \$23.50, Valley furnace, or \$24.40, Pittsburgh, the 90c. freight rate having gone into effect on June 1. There is not much inquiry for Foundry Iron, actual sales being only of small lots. We quote Northern No. 2 Foundry for spot shipment at \$25.50 to \$26; for third quarter delivery \$23.50 to \$24, and for last half at \$23 to \$23.50, Valley furnace. There is very little doing in Forge Iron, and we quote Northern brands at \$22.25, Valley furnace, or \$23.15, Pittsburgh.

Steel.—Deliveries by the mills on Billets and Sheet and Tin Bars are better than for some time and prices are easier. We quote Bessemer Billets at \$30, and Open Hearth at \$31.50, Pittsburgh. We note a sale of 10,000 tons of Bessemer Billets and Slabs for last half of the year delivery in Pittsburgh District at \$30, Pittsburgh. A considerable tonnage of Axle Billets has been sold in this market recently, and we quote these at \$35, Pittsburgh, but on a firm offer and for desirable tonnage, this price might be shaded about \$1 a ton. We quote Sheet and Tin Bars in random lengths at about \$31, at Youngstown or Pittsburgh mill.

(By Mail.)

Ferromanganese.—The fact that contracts have been made for Manganese Ore for deliveries extending over next year at relatively high prices is taken to indicate that prices on Ferro may show an advance before long. The market has been low for some time, and it is claimed that prices are lower than they should be in view of the present high cost of Ores. We note a sale of 50 tons of 80 per cent. English Ferro for June and July shipment at \$65.50, Pittsburgh. We quote English 80 per cent. Ferro for June shipment at \$66 to \$66.50; July, August and September at \$65.50, and for last half of the year at \$63, Baltimore, or about \$65, Pittsburgh. It is stated that recent quotations of \$61, Balti-

more, or \$63, Pittsburgh, for last half were lower than the actual market warranted.

Muck Bar.—There is a continued active demand for Muck Bar made from all Pig Iron, and, with a light supply, prices are firm and relatively high. A sale of 500 tons of Bar made from all Pig Iron is reported at \$38, and we quote the market at that price.

Skelp.—It is almost impossible to obtain Sheared Iron or Steel Skelp for early delivery at any price, the mills being filled up for months ahead. In fact, several Skelp mills report that they are practically filled up for the balance of this year. For forward delivery we quote: Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 1.90c. to 1.95c.; Grooved Iron Skelp, 2.20c. to 2.25c.; Sheared Iron Skelp, 2.30c. to 2.35c.

Rods.—Some little improvement in the supply of Rods is reported, due to the fact that the mills are getting better deliveries of Steel. We quote Bessemer and Open Hearth Rods at \$37 to \$38, Pittsburgh, the higher price being for prompt shipment.

Steel Rails.—No large tonnage in Standard Sections has been placed with the local mill since our last report. The demand for Light Rails is large, and the Carnegie Steel Company has taken about 2500 tons in the past week. We quote Light Rails as follows: \$33 to \$34 for 20 to 45 lb.; \$34 to \$35 for 16-lb., and \$35 to \$36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at \$28, at mill.

Structural Material.—The market is rather bare of large work. A good many important jobs are in sight, but they develop slowly. There are fully 25,000 tons of Steel involved in local work for which plans have been made, but for which no bids have yet been asked. There is some complaint over very low prices being made by some of the Structural concerns, and it is claimed that some large jobs taken recently were at prices very close to, or perhaps below, actual cost. Business entered by the American Bridge Company in May amounted to about 40,000 tons, a slight falling off as compared with April. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—The mills are congested with tonnage on Sheared Plates, but the demand for Universal Plates is not so active, and some mills are in position to make deliveries on these in from two to three weeks. Sales of about 5000 tons of wide Sheared Plates, for delivery over last half, are reported at 1.70c., Pittsburgh. We quote: Tank Plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼ in. to and including 3-16 in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ¼ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The mills are slowly catching up on deliveries, due to a more liberal supply of Steel and of cars, but premiums continue to be paid for prompt deliveries, especially on Galvanized Sheets, on which the mills are still much behind. The Sheet mills are pretty well filled up for the next two or three months, and stocks held by both jobbers and mills are very light. We quote: For forward delivery, Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing

Sheets, No. 28 gauge, \$3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Hoops and Bands.—Specifications against contracts continue to come in freely, and a moderate amount of new tonnage is being placed, which in some cases commands slight premiums over official prices for forward delivery, which are as follows: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Cotton Ties.—Some additional tonnage was placed in the past week at the official price of 95c. a bundle, and most large consumers are now covered for their season requirements.

Tin Plate.—The demand has quieted down to some extent, and with the certainty of a very late fruit crop consumers are disposed to hold off, placing their contracts for late in the year delivery. All the leading Tin Plate mills are pretty well filled up through the third quarter, but relatively little tonnage has been placed for delivery in the last three months in the year. We quote for third and fourth quarter delivery as follows: \$3.90 for 100-lb. Cokes, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Bars.—The demand for Steel Bars continues abnormally heavy, and in the past week additional tonnage for delivery over the next year has been placed by the implement manufacturers. The car builders are also placing good orders both in Iron and Steel Bars. Leading Steel Bar interests are practically sold up to October on contracts, against which consumers are specifying very freely. Effective June 1, the freight rate on Bars from Pittsburgh to Chicago is 18c. per 100 lb., against 16½c., the previous rate. We quote Refined Iron Bars at 1.75c. to 1.80c., Pittsburgh, and Steel Bars for forward delivery at 1.60c., base, half extras, f.o.b. Pittsburgh.

Spelter.—The demand continues dull, but prices have been fairly steady. We quote prime grades of Western Spelter in large lots at 6.25c., St. Louis, equal to 6.37½c., Pittsburgh.

Merchant Steel.—We note an active demand for Implement and Tire Steel, some good sized season contracts having been placed in the past week. The demand for Shafting is fairly active, and reports that prices are being shaded are denied. The market is firm, and we quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—We note a fairly heavy demand for standard sizes, 5½ x 9-16 in., and an abnormally heavy demand for the smaller sizes, on which the mills are much behind in deliveries. Some large inquiries are in the market for Spikes, the Atlantic Coast Line inquiring for 500 tons and Chesapeake & Ohio for 1000 tons. We quote standard sizes at \$2.20, but in special cases and for exceptionally desirable orders \$2.15 has been done. We quote the smaller sizes at \$2.40 to \$2.50 per 100 lb.

Merchant Pipe.—Owing to the extraordinary demand for Merchant Pipe, the mills are making little progress in catching up on deliveries, being apparently as far behind as ever. None of the leading Pipe mills is taking business except for indefinite delivery after present orders have been filled. A general advance in freight rates on tubular goods went into effect on June 1, the rate from Pittsburgh to Chicago now being 18 cents per 100 lb. instead of 16½ cents as before. Contracts carrying delivered prices are being revised to meet the higher freight rates. Discounts on Steel Pipe are as follows:

	Merchant Pipe.	
	Jobbers, carloads. Steel.	Galv.
	Black.	%
¾ to 1 in.....	.65	.49
1 in.....	.67	.53
1½ in.....	.69	.57
2 to 6 in.....	.73	.63
7 to 12 in.....	.70	.55
Extra strong, plain ends:		
¾ to 1 in.....	.58	.46
1½ to 4 in.....	.65	.53
4½ to 8 in.....	.61	.49
Double extra strong, plain ends:		
1½ to 8 in.....	.54	.43

All above discounts are subject to 1 point on the base and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded one-half

point or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.

	Black.	Galv.
3/4 to 6 in.	67	57
1/2 in.	62	50
3/8 in.	60	42
1/4 and 3/4 in.	58	42
7 to 12 in.	62	47

Extra Heavy Iron Pipe, Plain Ends.

1/4, 1/2 and 3/4 in.	62	40
1/2 to 4 in.	59	47
4 1/2 to 8 in.	55	42

Boiler Tubes.—The demand for both Locomotive and Merchant Tubes continues heavy, and the mills are much behind in deliveries. Some of the leading railroads have recently placed heavy contracts for Locomotive Tubes for delivery over the next three or four months. Official discounts on Boiler Tubes are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1 1/4 in.	41	47
1 1/4 to 2 1/4 in.	42	59
2 1/4 in.	47	61
2 3/4 to 5 in.	52	65
6 to 13 in.	42	59
2 1/4 in. and smaller, over 18 ft. long, 10 per cent. net extra.		
2 3/4 in. and larger, over 22 ft. long, 10 per cent. net extra.		

Iron and Steel Scrap.—The better tone in the Steel Scrap market continues, and prices are firm, with some improvement in demand. It is believed that if present high prices on Pig Iron are maintained, prices on Steel Scrap will show still further betterment. Dealers quote about as follows: Heavy Steel Scrap, \$18.50 to \$18.75, for Pittsburgh, Steubenville and Sharon delivery, prices depending on quality; No. 1 Railroad Wrought Scrap, \$18.75 to \$19, and No. 2, \$18.25 to \$18.50; Bundled Sheet Scrap, \$16.50; No. 1 Busheling Scrap, \$18 to \$18.25; No. 2 Busheling Scrap, \$15 to \$15.25; Old Steel Rails, short pieces, for Open Hearth purposes, \$18.50 to \$19; Old Steel Rails, rerollers, \$19; Low Phosphorus Melting Stock, \$22.50 to \$23; Cast Iron Borings, \$14.25 to \$14.50; Stove Plate, \$16.50 to \$16.75; Old Car Wheels, \$26 to \$26.25; Steel Axles, \$21.25 to \$21.75; Grate Bars, \$16.25 to \$16.50; No. 1 Cast Scrap, \$22; all above prices are per gross ton, f.o.b. Pittsburgh.

Coke.—There is talk of some action being taken by the leading Coke interests with a view of lifting the prices of Coke to a more satisfactory level, but up to this time nothing definite has been done. The continued low prices ruling for Furnace and Foundry Coke for prompt shipment are seriously affecting the making of new contracts, consumers preferring to hold off, believing they will be able to get lower prices by so doing. There is still an oversupply of Coke, and Connellsville Furnace Coke for prompt shipment is being offered at \$2 to \$2.10 and 72-hr. Foundry at \$3 to \$3.25 a ton at oven. Settlement of Coke contracts for May on the basis of 7 tons of Coke for 1 ton of Bessemer Iron will result in such Coke concerns getting about \$3.32 for their May Coke, which is fully \$1 a ton, or more, higher than the market for prompt shipment. Quotations of \$2.65 at oven on strictly Connellsville Furnace Coke for last half of the year shipment have been made by Coke interests. The output continues exceedingly heavy, the Upper and Lower Connellsville regions having made last week about 415,000 tons.

Cincinnati.

FIFTH AND MAIN STS., June 5, 1907.—(By Telegraph.)

Pig Iron.—The local market has been very quiet; in fact, it might be termed dull. Inquiry for next year's business, that a week or two since appeared to show a gradual development, has subsided to a great extent. It would appear from reports received from contiguous territory that considerably more activity has been manifest there and a number of fair sales have been made, which is in marked contrast with the situation here. Spot prices are somewhat easier, and as transportation facilities are showing much improvement, and the rank and file of consumers are receiving a fair supply of the Iron due on old contracts, they are manifesting little disposition to anticipate their requirements for any length of time in the future. Fourth quarter demand is a degree more active, and a small number of inquiries are coming forward from those melters who have sufficient Iron to carry them up to that period. Prices on No. 2 Foundry for this delivery range from \$19.50 to \$20, Birmingham, with \$23.50, Valley furnace, perhaps a fair quotation for Northern brands. What few sales have been made into 1908 have been on an \$18.50, Birmingham, basis, which is, without doubt, the ruling quotation. Freight rates from Hanging Rock District to Cincinnati are \$1.15

and from Birmingham, \$3.25. We quote for second quarter delivery, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	\$24.75 to \$25.25
Southern Coke, No. 2	24.25 to 24.75
Southern Coke, No. 3	23.75 to 24.25
Southern Coke, No. 4	22.75 to 23.25
Southern Coke, No. 1 Soft	24.75 to 25.25
Southern Coke, No. 2 Soft	24.25 to 24.75
Southern Coke, Gray Forge	21.75 to 22.25
Southern Coke, Mottled	20.75 to 21.25
Ohio Silvery, 8 per cent. Silicon	30.65 to 31.15
Lake Superior Coke, No. 1	24.65 to 25.15
Lake Superior Coke, No. 2	24.15 to 24.65
Lake Superior Coke, No. 3	23.65 to 24.15

Car Wheel Irons.

Standard Southern Car Wheel	\$29.00 to \$29.50
Lake Superior Car Wheel	27.50 to 28.00

Coke.—The market is active, but prices more or less irregular. A very heavy tonnage has been sold for the balance of the year, the contract price averaging from \$3 to \$3.25 f.o.b. ovens, for the best brands of Virginia and Connellsville Foundry grades.

Finished Iron and Steel.—The demand for all classes of finished material is active and the market is strong. Some business has developed for 1908, but up to the present it has been proportionately small. Prices appear to be well maintained. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.93c., with half extras; smaller lots from store, 2c., with full extras. Steel Bars, carload lots, 1.73c., half extras, smaller lots from store, 1.95c., with full extras. Base Angles, carload lots, 1.83c. Beams and Channels, carload lots, 1.83c., base. Plates, 1/4-in. and heavier, carload lots, 1.83c., base, and smaller lots from store, 2.25c. Sheets, No. 16, carload lots, 2.05c., and smaller lots from store, 2.60c.; No. 14, carload lots, 1.95c., and smaller lots from stock, 2.50c. Steel Tire, 1 x 1/4 in. or heavier, 1.93c. in carload lots.

Old Material.—The demand is sufficient to consume the available supply. Prices are somewhat irregular. We quote dealers' prices, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton	\$16.50 to \$17.00
Cast Borings, net ton	9.00 to 9.50
Steel Turnings, net ton	12.00 to 12.50
No. 1 Cast Scrap, net ton	17.50 to 18.00
Old Iron Axles, net ton	25.50 to 26.00
Old Iron Rails, gross ton	24.00 to 25.00
Old Steel Rails, long, gross ton	17.50 to 18.00
Relaying Rails, 56 lb. and up, gross ton	28.25 to 29.25
Old Car Wheels, gross ton	24.00 to 24.50
Low Phosphorus Scrap, gross ton	19.50 to 20.00

Philadelphia.

PHILADELPHIA, PA., June 4, 1907.

There is not much change in the Iron and Steel trades, although there is a general consensus of opinion that the demand for Pig Iron is less urgent. There is nothing that can be called weakness, but the easing up in demand is in some quarters regarded as significant, although it is almost impossible that any real weakness could develop as regards deliveries during the next three or four months, because everybody wants Iron and the furnaces can only meet the requirements of consumers by making a very full output. The high prices which are now quoted for Pig Iron, however, are somewhat inimical to any great confidence as regards deliveries during the more distant future. This feeling of timidity has been increased by the unfavorable weather conditions and by the continued unsettlement in Wall Street, so that it is difficult to maintain the optimism of the past 12 months, and in case of distinct reaction this feeling, if it once gets started, might run further than actual conditions warrant. Taking the Iron and Steel trade by itself, however, it would seem to be a pretty safe conclusion that no material change in prices is likely to be made for several months to come, and it might be well into next year before there is any serious reaction. A change to more favorable weather conditions would probably be of considerable advantage, and this may be reasonably expected after such a long period of unfavorable temperatures, almost through the entire country, and even the past 48 hr. seem to have helped things considerably. There is more buying of finished products, and the feeling in that direction is better than it has been for several weeks past. The only drawback seems to be the possibility of difficulty with labor, which, however, is a trouble that is always with us at this season of the year.

Pig Iron.—The demand during the week has been considerably below that of several immediately preceding, but there are no indications of any relaxation in prices. As a rule, consumers are well covered for deliveries up to October, and while some business is being done for later dates, buyers as a rule are disposed to go slow until they can see a little further ahead. There are some exceptional cases, however, in which good sized orders have been placed for the last quarter of 1907, as well as for the first quarter of 1908, but generally speaking the feeling is one of temporary indifference, without developing strength, weakness or anxiety. Furnaces have probably 80 per cent. of their output sold for delivery during the remainder of the year, so that they are in a position to be as indifferent as consumers are, besides which

any attempt to force the market for forward deliveries would prejudice the entire situation, which of course they will be careful to avoid. Consequently, if buyers are not prepared to place orders at the quoted rates, sellers are willing to wait before making special efforts to market their products so far ahead. For all practical purposes prices are the same as last week, except Low Phosphorus, which is strong and likely to be in good demand in the near future. For this grade most of the local furnaces are quoting \$27 f.o.b. cars, and as foreign material would cost at least 50 cents more alongside ship, the chances are in favor of higher rather than lower prices, as some good sized lots will be wanted in the near future. Basic Iron has been very quiet the past week, only a few thousand tons having been sold for last quarter at about \$23.25 delivered; the greater portion, however, being for the last month of the last quarter. Mill Irons are scarce, and for June shipment have been sold at \$22.50 and \$22.75 f.o.b. cars at nearby furnaces. Middlesbrough Iron is still taken quite freely at \$22.50 f.o.b. cars on dock, and is so closely sold up that shipments to arrive during the current month are to a great extent already contracted for at about the prices named. Several cargoes are expected to arrive in the next three or four weeks, so that the supply of that class of Iron will probably continue in the same ratio as during the earlier months of the year. For the dates named below, quotations are as follows for deliveries in buyers' yards, eastern Pennsylvania or adjoining territory.

June Deliveries.

No. 2 X Foundry.....	\$25.50 to \$26.50
Gray Forge.....	22.75 to 23.25
Basic.....	24.75 to 25.00
Middlesbrough, No. 3.....	22.50 to 22.75
Scotch Iron.....	24.50 to 25.00

Third Quarter 1907.

No. 2 X Foundry.....	\$24.50 to \$25.00
Gray Forge.....	22.75 to 23.00
Basic.....	23.75 to 24.25
Low Phosphorus.....	27.75 to 28.25

Fourth Quarter 1907.

No. 2 X Foundry.....	\$23.50 to \$24.00
Basic.....	23.00 to 23.50
Gray Forge.....	22.00 to 22.50
Low Phosphorus.....	27.75 to 28.00

Ferroalloys.—The market is stronger, and asking prices for deliveries in the last half of the year would range from \$64 to \$66. Spot Ferro sold at \$65 to \$66 a few days ago, but there is a stronger undertone, and it is hardly likely that such purchases could be duplicated this week.

Steel.—A considerable amount of business has been done in the past few days, and while prices are not higher, they are firm, at the full quotations of last week. Several large contracts have been renewed for the third quarter and mills in this vicinity are pretty well provided with work from now on to October. Quotations of last week may be repeated at \$32.50 to \$33 for nearby deliveries for ordinary Rolling Billets, and \$36 to \$38 for Forging Steel.

Plates.—There is a pretty steady run on the Plate mills, both for prompt shipments and for deliveries during the summer months. The tonnages called for are not particularly heavy, but they are of a character that indicates pretty active conditions. Many consumers who use a good deal of material in the aggregate have placed orders, although individually the lots were not of great importance. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.93½	1.98½
Flange or Boiler Steel.....	2.03½	2.08½
Marine.....	2.23½	2.28½
Locomotive Firebox Steel.....	2.43½	2.48½

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick.....	\$0.10
Nos. 7 and 8, B. W. G.....	.15
No. 9, B. W. G.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00

Structural Material.—There is an improvement in the demand for this class of material. Large orders are not on the market to any extent, but there is a very good run of orders, ranging from carload lots up to 100 to 200 tons each. These are sufficiently numerous to keep the local mills actively employed, and the outlook is considered more promising than it has been for several weeks past. Prices are steady and unchanged, at 1.83½c. for Beams, Channels and Angles, according to specification.

Bars.—The demand is improving, and specifications which have been held up for several weeks are now coming in more freely, and it is expected that the mills will have full employment during the greater portion, if not during all the summer months. Prices are steady, at 1.83½c. for Best Refined Iron and practically the same figure for Steel Bars for prompt shipment, although for deliveries 60 to 90 days later Steel Bar quotations are 1.73½c., but at this

price no guarantee can be given as to the exact date of delivery.

Sheets.—The favorable conditions mentioned last week are still in force, and prompt deliveries are at somewhat of a premium, although in ordinary cases mill shipments are quoted as follows, with the usual additions for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—The peculiar conditions which have been so frequently referred to during the past few weeks are still in force, and at the moment seem likely to continue indefinitely. This applies to Steel Scrap especially, for which dealers are paying 50c. to 75c. more than consumers are willing to pay. The latter have plenty of material due them at \$19, but the sellers are unable to deliver, simply because the article is oversold. This has more or less influence on other grades, which are stubbornly held at last week's prices. A fair average of bids and offers for deliveries in buyers' yards in this district are about as follows:

Steel Crops and Rails.....	\$20.00 to \$20.50
No. 1 Steel Scrap.....	19.00 to 20.00
Low Phosphorus.....	24.50 to 25.00
Old Steel Axles.....	22.00 to 22.50
Old Iron Axles.....	31.50 to 32.00
Old Iron Rails.....	27.50 to 28.00
Old Car Wheels.....	25.50 to 26.00
Choice No. 1 R. R. Wrought.....	21.00 to 21.50
No. 1 Yard Scrap.....	19.00 to 19.50
Long and Short.....	19.00 to 19.50
Machinery Scrap.....	21.00 to 21.50
Wrought Iron Pipe.....	17.00 to 17.50
No. 1 Forge Fire Scrap.....	16.75 to 17.25
No. 2 Light.....	11.50 to 12.00
Wrought Turnings.....	17.00 to 17.50
Heavy Machinery and Axle Turnings.....	17.25 to 17.75
Stove Plate.....	17.75 to 18.25
Cast Borings.....	16.00 to 16.25
Grate Bars.....	16.75 to 17.25

Joseph F. Body and Samuel H. Baird announce that they have formed a copartnership, under the firm name of Body, Baird & Co., to deal in Pig Iron, Steel, Scrap, Coal, Coke and Iron Ores, with offices in the Pennsylvania Building, Fifteenth and Chestnut streets, Philadelphia, Pa.

John J. Caine, Philadelphia, Pa., Iron and Steel Scrap merchant, previously located in the Real Estate Trust Building, has removed to 1413-1416 North American Building.

Cleveland.

CLEVELAND, OHIO, June 4, 1907.

Iron Ore.—Ore is now moving satisfactorily from the upper lake ports, and vesselmen and shippers expect that a very heavy tonnage will be brought down this month. The only delay at the present time is caused by the bunching of boats. The local Ore docks were so crowded early this week that several vessels had to be held out in the lake to await their turn. The same condition exists at the other Ohio ports. The freight situation remains unchanged. Vesselmen are still somewhat behind on their contracts, and there is little wild tonnage on the market. The Ore shippers are taking about all the tonnage that is offered. The car supply is good, although the shippers are often unable to obtain the kind of cars that they want. Very little Ore is being left on the docks, nearly all of it being taken directly from the boats to the furnaces. There is still an occasional inquiry for Ore, and a few sales were made in small lots during the week. Prices are unchanged, being as follows at Lake Erie docks, per gross ton: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.25; Mesaba Non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous Non-Bessemer, \$2.25 to \$2.60.

Pig Iron.—The past week has been rather quiet, although there have been a fair amount of inquiries for Northern Foundry Iron for the last quarter delivery and for the first quarter and first half of 1908. Foundries seem to be pretty well covered for the third quarter, and there is little call for Pig Iron for that delivery or for spot shipment. Prices remain firm, and the furnaces are practically sold up in this district for the third quarter, and little Iron is to be had for the fourth quarter. We quote Northern Foundry No. 2 for fourth quarter delivery at \$23, Valley furnace. A local furnace is holding firm at \$25 for third quarter delivery for No. 2 Foundry at furnace, and at \$24 for fourth quarter delivery, at furnace. For the first quarter and first half of 1908 the furnacemen are asking \$22 at furnace for No. 2 Northern Foundry, and some sales have been made during the week at that price in small lots. Inquiries from Eastern consumers for what in the aggregate amounts to a large tonnage have been received in the local market for Foundry and Malleable Iron for the fourth quarter delivery. A few sales of Malleable Bessemer for the first half of 1908 have been made in small lots, but there seems to be no further inquiries out for a large tonnage, and furnaces prefer not to sell at the present time. The minimum quotation on Malleable Bessemer for first half delivery is \$22, Valley furnace. There are still many inquiries for Basic Iron for the last half delivery, and some for spot shipment, but no

sales have been made in this district during the week. The Basic situation remains very firm. There are some inquiries for Southern Iron for next year, and a few small sales are reported at \$18.50, Birmingham, for Southern Foundry No. 2 for first quarter delivery. Quotations for the last half of 1907, f.o.b. Cleveland, are as follows:

Bessemer	\$23.00
Northern Foundry, No. 1	\$24.50 to 25.00
Northern Foundry, No. 2	24.00 to 24.50
Northern Foundry, No. 3	23.50 to 24.00
Gray Forge	23.00

Finished Iron and Steel.—Specifications have been coming in heavily for all kinds of finished material, and particularly for Structural Shapes and Plates, but only a small volume of new business has been booked, as compared with that taken during the previous two or three weeks. There has been some further buying of Steel Bars by the implement makers and they are now about all covered for their next year's requirements. The Bolt and Nut men have been buying freely and most of them now have their Steel Bar requirements for the year under contract. The general situation seems as a whole a little easier, although some of the larger mills report no improvement in deliveries. The car companies are making heavy specifications for Plates, but the situation has eased up somewhat and some of the mills are now looking for orders. Deliveries on Universal Plates on large specifications can be secured in from two to three weeks and on Sheared Plates in from four to six weeks. The general demand for Steel Bars continues good, although not much premium business is being done. For future delivery Steel Bars are quoted at 1.70c., Cleveland, half extras, for carload lots. There is a fair demand for Iron Bars and some of the mills can make prompt shipment. We quote Iron Bars at 1.80c., Cleveland, for carload lots. The Structural situation continues quite satisfactory, and considerable material will be required soon for new buildings in this territory. Among the local requirements that will come up soon will be about 700 tons for a bank building and 800 or 900 tons for a manufacturing plant. One eastern Pennsylvania Structural mill has notified its local representative to take no further business except at a premium, because it is unable to sell its output at the present prices in this territory at a profit with the present cost of raw material. This practically means the withdrawal of the company from the local market, as there is no demand for Structural at premium prices. The Sheet situation is tighter than ever. The demand continues heavy and some of the independent mills are five to six months behind on deliveries. For prompt delivery Sheets command a premium of \$2 or more a ton. Sales of Traction Rails aggregating several hundred tons were made in this market during the week. Jobbers report that the demand for material out of stock continues heavy. They quote Steel Bars at 1.95c. out of stock, and Iron Bars at 2c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28 One Pass Cold Rolled, 3.05c.; No. 28 Galvanized, 4.15c. The stock price on Boiler Tubes, 2½ to 5 in., is 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—Cast Scrap is very strong and somewhat scarce, although dealers are not having much trouble in finding enough to supply the demand. Otherwise the market continues quiet, with prices firm and about stationary. About the only buying during the week has been by the dealers and the foundries, and there are but few inquiries from other sources. Railroad lists are out this week for the sale of about 2500 tons by the Pennsylvania Railroad, 2000 tons by the Big Four and some tonnage by the Erie. Tin Scrap is weaker. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	\$16.75 to \$17.00
Old Iron Rails	24.00 to 25.00
Steel Car Axles	22.50 to 23.00
Old Car Wheels	23.00 to 23.50
Relaying Rails, 50 lb. and over	29.00 to 31.00
Relaying Rails, under 50 lb.	31.00 to 32.50
Heavy Melting Steel	16.50 to 17.00
Railroad Malleable	19.00 to 19.50
Agricultural Malleable	15.50 to 15.50
Light Bundled Sheet Scrap	15.50 to 16.50
Bundled Tin Scrap	14.00 to 16.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	\$26.00 to \$27.00
Cast Borings	10.50 to 11.00
Iron and Steel Turnings and Drillings ..	12.50 to 13.00
No. 1 Busheling	14.50 to 15.00
No. 1 Railroad Wrought	16.50 to 17.00
No. 1 Cast	18.50 to 19.00
Stove Plate	15.00 to 15.50

Coke.—The demand is good for Foundry Coke, and prices are firm. Dealers are asking \$3 to \$3.50, at oven, for the last half, \$3.25 being the usual price. One big independent producer is reported to be holding to \$3.50 for Connells-ville Coke for any delivery. Considerable tonnage has been sold during the week, and one producer is entirely out of the market for the year. Some foundries want to buy for the first half of 1908 at the same price as the last half, and some sales have been made for delivery from July to July. Foundry Coke for prompt shipment is selling at \$3.15 to

\$3.25, at oven. Furnace Coke is quiet. Dealers are asking \$2.25 to \$2.75, at oven, for last half delivery.

CLEVELAND, OHIO, June 5, 1907.—(By Telegraph.)—The Ore shipments from the upper lake ports during May were the greatest in the history of the trade, the movement up to June 1 having broken all previous records. The dock reports, all but two of which are in, show that the May Ore shipments reached over 5,600,000 gross tons, which is about 1,300,000 tons more than in the same month last year. The total movement up to June 1 was about 500,000 tons ahead of the same time last year.

New York.

NEW YORK, June 5, 1907.

Pig Iron.—Aside from a fair volume of business from New England the market has been very quiet during the past week. The market remains firm. We quote spot Northern Iron \$25.50 to \$26 for No. 1 Foundry, and \$24.50 to \$24.75 for No. 2 Foundry. For the second quarter we quote \$25 to \$25.25 for No. 1 Foundry, \$23.50 to \$24.25 for No. 2 Foundry and \$22.75 to \$23 for No. 2 Plain. No. 2 Southern Foundry is nominally quoted \$26.25 to \$26.50 for spot and \$23.25 to \$23.75 for the third quarter.

Steel Rails.—For delivery in 1908 the largest Rail order placed in the past week was 40,000 tons for the Chicago & Northwestern. There has also been taken 7000 tons for the Arkansas, Louisiana & Gulf and 6000 tons for the Wisconsin Central. The Pennsylvania Railroad has bought 3000 tons additional for this year. The actual placing of its requirements for 1908 awaits the definite formulation of its new specification and the acceptance of the latter by the mills. The Atchison tonnage for next year will probably run up to 50,000, of which a considerable part is expected to be rolled by an Eastern mill. The Seaboard Air Line has an inquiry in for a large tonnage, for delivery in the latter part of this year and through 1908.

Structural Material.—The mills report specifications and new business coming in at a good rate, notwithstanding that fabricating companies have not found recent conditions entirely to their liking. Locally new inquiry has not been plentiful and though complaint of low prices for fabrication has been pretty constant since the opening of the year, it is perhaps more pronounced recently. A New York contract on which figuring has been done is that for the loop connecting the Brooklyn bridge with the Williamsburg bridge over the East River. The Cambria Steel Company has taken a 1200-ton contract for the addition to the Hendrik Hudson apartment building, at 110th street and Riverside drive. Among projects that will come forward later and require considerable Steel are a new power house for the Edison Company, a power house on the New Jersey side of the North River for the Pennsylvania Railroad's electrically operated terminal and suburban lines and a West Shore power house at Weehawken. The principal railroad bridge contract of the week was 2000 tons for the Pacific Coast extension of the St. Paul system. In May the American Bridge Company closed 40,000 tons, or somewhat less than its average for the four months preceding. The total of fabricating contracts closed in May is now put at upward of 175,000 tons. We quote as follows on mill shipments, tidewater deliveries: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10c. Sales are made out of stock of material cut to length at 2¼c. to 2½c.

Bars.—Orders for Bar Iron are not now coming in so freely as during the past month, but the market price for Best Refined is quite well maintained on the basis of 1.70c. Pittsburgh, or 1.80c. tidewater. Steel Bars are in much greater demand than Bar Iron, with all the leading mills reported crowded with work. Quotations range from 1.60c. Pittsburgh, or 1.70c. tidewater, on deferred delivery, to 1.86c. tidewater, or higher for early delivery.

Plates.—Practically no improvement is observed in the local demand, which runs almost entirely to small lots. Quotations for tidewater delivery are as follows: Sheared Tank Plates, 1.84½c. to 1.94½c.; Flange Plates, 1.94½c. to 2.04½c.; Marine Plates, 2.24½c. to 2.34½c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—Sales by local selling agencies have aggregated less than 5000 tons the past week, the largest transaction calling for 1200 tons. While prices are very firm, the market still lacks the usual snap seen in the spring months. The foundries, however, are well sold up, and no indication is manifested of a disposition to make lower prices. All bids on a high pressure line in Philadelphia have been thrown out, as the prices named made the aggregate cost higher than the appropriation. Quotations are continued on the basis of \$37 to \$38 per net ton, tidewater, for carload lots of 6-in.

Old Material.—Dealers still continue short of Heavy Melting Steel Scrap with which to fill their contracts, while consumers are pressing even more anxiously than heretofore

for deliveries on contracts. The demand for all kinds of Foundry Scrap, as well as for Cast Borings, Heavy Steel Turnings and Pipe Scrap, continues strong. The local situation shows no weakness whatever, while accumulations are light, the supply coming from usual sources being barely adequate to meet the current demand. Quotations per gross ton, f.o.b. New York, are as follows:

Old Girder and T-Rails for Melting	...\$16.25 to \$16.75
Heavy Melting Steel Scrap	..... 16.25 to 16.75
Old Steel Rails, rerolling lengths	..... 18.75 to 19.50
Relaying Rails	..... 27.50 to 28.00
Old Iron Rails	..... 24.00 to 24.50
Standard Hammered Iron Car Axles	..... 30.00 to 30.50
Old Steel Car Axles	..... 20.50 to 21.00
No. 1 Railroad Wrought	..... 19.50 to 20.00
Iron Track Scrap	..... 17.50 to 18.00
No. 1 Yard Wrought, long	..... 17.50 to 18.00
No. 1 Yard Wrought, short	..... 17.00 to 17.50
Wrought Pipe	..... 14.50 to 15.00
Light Iron	..... 11.00 to 11.50
Cast Borings	..... 12.50 to 13.00
Wrought Turnings	..... 14.50 to 15.00
Old Car Wheels	..... 23.00 to 23.50
No. 1 Heavy Cast, broken up	..... 19.00 to 20.00
Stove Plate	..... 16.50 to 17.00
Grate Bars	..... 14.00 to 14.50
Malleable Cast	..... 20.00 to 20.50

Nash, Isham & Co., Pig Iron and Coke merchants, have opened an office at 621 Board of Trade Building, Boston, Mass., in charge of F. F. Newcomb, who for many years has been associated with Rogers, Brown & Co. at their Philadelphia office.

Metal Market.

NEW YORK, June 5, 1907.

Pig Tin.—The statistics concerning the movement of Pig Tin up to May 31, as compiled by C. Mayer, secretary of the New York Metal Exchange, were not reassuring to holders of the metal. Deliveries into consumption in this country during May were light, amounting to but 2500 tons. The total deliveries for the five months of this year show a decrease of 1150 tons, compared with the same period last year. The combined deliveries of London and Holland for the first five months of the year show an increase of 662 tons. The arrivals at Atlantic ports during May amounted to 2652 tons, which was larger than the deliveries. The stocks in the United States increased 152 tons, being 1460 tons, despite the small arrivals here. The total visible supply, amounting to 12,015 tons, is a decided increase compared with the end of April, which was 9839 tons, but compared with the end of May last year a decrease of 588 tons is shown. There has been a better inquiry, but Tuesday was the only day when there was a good volume of business. Price changes have been toward lower levels. On May 29 sales were made at 42.45c., and offerings at 42.30c. on May 31 brought no buyers. The same conditions prevailed on June 1, when Tin was offered at 42.25c. After the publication of the statistics sales were made at 41.40c., on June 3. The market continued to decline and a large amount of business was transacted at 41.15c. to 41.20c., on June 4. The heavy business here was largely responsible for an advance of £1 10s. in London to-day, and that market closes at £187 for spot and £184 for futures. Tin can be had to-day at 41.50c. The arrivals amount to 492 tons and the floats 2248 tons. The dock strike is having but little influence in the Tin market.

Copper.—Beginning with this issue a quotation for Electrolytic Copper will be included in the table entitled "A Comparison of Prices." A much wider market for Electrolytic has existed for some time, and the proportion of Lake Copper produced shows a steady decrease compared with the total amount of Copper in this country. Since 1880, when the United States began to be a factor in the world's production, the proportion of Lake Copper has decreased from 82.2 to 25.5 per cent. of the total. The light exports during May, amounting to but 9010 tons, show that European consumers are buying sparingly, but reports from the other side do not indicate any diminution of business. The total exports for the first five months this year, 66,018 tons, show a falling off of 17,113 tons, as compared with the same period last year. On May 30, which was a holiday in this country, quite a respectable volume of buying was indulged in by European consumers, who took in all somewhat over 1000 tons of Electrolytic at about 23.75c., c.i.f., European ports. It ended, however, as suddenly as it came. American consumers are not buying, and consequently quotations are nominal at 24.25c. to 25c. for Lake, but this grade can be obtained within this range. Electrolytic is easier at 23.37½c. to 23.87½c., and small sales to domestic consumers have been made in this range. Casting Grades are easier at 22c. to 22.75c. The London market is again lower, closing at £92 2s. 6d. for spot and £95 2s. 6d. for futures. Best Selected is lower at £108 10s. A question pertinent at this time is heard in the metal trade to the effect that if the larger American consumers are so confident of the stability of the market at their selling prices, why do they not purchase the floating supply in London, which is small, for there is a good profit below the actual London prices and the asking prices here? While the market for

finished lines of brass goods is steady, deliveries show a marked improvement. On the other hand, it is observed that the interests which are quoting the lowest prices are not anxious to sell any amount of metal at the figures they name. The superintendent of the United States Mint, Philadelphia, will receive proposals until June 12 for 350,000 lb. of the highest grade of Electrolytic Copper, the Ingots being cast with a low bridge, 10 or 12 lb. each in weight. Specifications and proposal sheets may be had upon application to John H. Landis, Superintendent, Philadelphia, Pa.

Waterbury Average for Copper.—The Waterbury average for the month of May was 26c.

Lead.—The American Smelting & Refining Company reduced its price governing outstanding contracts ¼c. per pound, or to 5.75c., on June 3. This is the first change in price made by the leading interest this year, the previous change being an advance from 5.75c. to 6c., which was announced December 13, 1906. The company is accepting orders only at the price current date of shipment. Other sellers have likewise reduced their prices and spot Lead can be had in New York at 5.75c. to 5.80c., and in St. Louis at 5.65c.

Spelter.—Prices are a trifle higher on a better inquiry, but there is little actual business. Prompt shipments can be had at 6.50c., New York, and 6.40c., St. Louis.

Antimony.—Prices for Antimony are highly irregular and lower; in fact, there is no fixed price. Hallett's can be had at 17c. to 18c., Cookson's 19.25c. to 20c., and other brands at 16.50c. to 17c. The imports of Antimony for the first four months of the year show an increase of 50 per cent. compared with last year.

Aluminum.—The producers of this metal are making headway in the matter of deliveries, but prices are largely nominal.

Nickel.—Prices are unchanged at 45c. per lb. for ton lots, and 55c. to 65c. for small quantities.

Quicksilver.—Prices are without change, \$42 per flask being quoted for jobbing lots.

Ferroalloys.—The demand is very quiet, but as considerable business has been booked for forward delivery prices are firm. Forward shipments of 50 per cent. Ferro-silicon are held at \$104, while premiums ranging from \$2 to \$6 are obtained for reasonably prompt shipments. Ferro-manganese is dull, and prompt shipments are quoted at \$67 to \$69, while forward deliveries can be had at \$64 to \$66.

Tin Plates.—A fair inquiry exists, but prices are unchanged at \$3.90, f.o.b. New York, and \$4.09 f.o.b. Pittsburgh, for 100 lb. IC Coke Plates.

Old Metals.—Business is dull, and prices on Heavy Cut and Crucible Copper, Heavy Machine Composition and Lead are lower. Dealers' selling prices are largely nominal, as follows:

	Cents.
Copper, Heavy Cut and Crucible	..... 21.50 to 21.75
Copper, Heavy and Wire	..... 21.50 to 21.75
Copper, Light and Bottoms	..... 19.50 to 20.00
Brass, Heavy	..... 15.25 to 15.50
Brass, Light	..... 12.25 to 12.50
Heavy Machine Composition	..... 18.75 to 19.00
Clean Brass Turnings	..... 13.25 to 13.75
Composition Turnings	..... 16.50 to 16.75
Lead, Heavy	..... 5.30 to 5.40
Tea Lead	..... 5.00 to 5.10
Zinc Scrap	..... 5.25

Iron and Industrial Stocks.

NEW YORK, June 5, 1907.

Stocks have again been under decided pressure, with further indications of liquidation. An important exception to the general course of the market was in the case of Car & Foundry common, which maintained nearly its full strength, in anticipation of the increase in the dividend announced on Monday. This stock sold up to 39¼ on Friday, ranging from that price to 37½ on Monday. Other stocks sold down to quite low prices on Monday morning, almost down to the low point realized a week previously. United States Steel common sold down from 34 on Friday to 31½ on Monday, and the preferred from 98½ to 96½; Locomotive common from 58 to 56; Pressed Steel common from 32½ to 31; Railway Spring common from 40 to 39; Republic common from 24½ to 24, and the preferred from 85 to 84½; Sloss-Sheffield common from 55½ to 54; Cast Iron Pipe common from 32 to 31½; Can preferred from 54½ to 52. Some recovery occurred on Monday afternoon, continuing since then, but in few instances were the prices of the previous Friday attained. Last transactions up to 1.30 p. m. to-day are reported at the following prices: United States Steel common 32½, preferred 97; Car & Foundry common 42½, preferred 99; Locomotive common 58, preferred 103; Steel Foundries common 61½, preferred 35; Colorado Fuel 29; Pressed Steel common 32½, preferred 88½; Railway Spring common 41½; Republic common 24½, preferred 85; Sloss-Sheffield common 55; Tennessee Coal 138½; Cast Iron Pipe common 33, preferred 82; Can common 5½, preferred 53½.

Census of the Dynamo and Motor Industry.

A recently issued 1905 census bulletin states that during the year (the returns being for 1904) there were constructed in the United States 15,080 dynamos of an aggregate of 1,328,243 hp., or an average of 88. The value of these machines was returned as a total of \$11,084,234, or an average of \$735. The average value per horsepower figures out at \$8.35. This compares with a total of 10,527 dynamos constructed in 1900, of a total of 770,832 hp., and a total value of \$10,472,576. These figures account for an average size in 1900 of 73 hp., an average value of \$993, and an average value of \$13.58 per horsepower. The tendency seems to have been along the line of cheapening costs of production, and may be traced to three causes: 1. Improved manufacturing methods, including standardization. 2. An increase in the general size of units, and more particularly in the number of large units turned out. 3. The construction of large numbers of dynamos intended for operation by steam turbines, which, with their high rates of revolution, materially reduce the cost of dynamos, as compared with slower moving units of the same power.

Of the total reported for the recent census, 13,756 machines of 853,800 hp. and valued at \$6,973,130 were direct current. The average size of these dynamos figures out at 62 hp., their average value at \$507, and their value at \$8.17 per horsepower. The alternating current dynamos numbered 1324, of an aggregate of 474,443 hp., and a value of \$4,111,104. These figures show an average size of 358 hp., or nearly six times that of the direct current units. The average value was \$3106, or more than six times that of the other type. The value per horsepower was \$8.67, or slightly above that for the direct current type, in spite of the largely increased average size of machine, this being due to the fact that an alternating current dynamo costs much more than a direct current unit of the same size.

The motors built for power purposes numbered in 1905 no less than 79,877, of which 54,242 were direct current and 25,635 alternating. The aggregate horsepower was 678,910, or an average of $8\frac{1}{2}$. The total value was \$13,120,948, or an average of \$164 per unit and of \$19.32 per horsepower. The total value of motors constructed for all purposes was \$22,370,626, or slightly more than twice as great as the figure for dynamos.

Water Tube Boilers in the German Navy.

The use of the Schulz-Thornycroft water tube boiler in the German Navy began in 1896, when it was adopted for use on torpedo craft. It has since been used in cruisers and battleships to a large extent. For a time the large cruisers were supplied with boilers having tubes of large diameter, but subsequent experience has seemed to demonstrate that the smaller tube gives a more satisfactory result, and all large cruisers recently put in hand have the latter type. For a time the battleships were fitted with a combination of these water tube boilers, with large tubes, and cylindrical boilers, the latter covering about 25 per cent. of the steam requirements. Of late, however, the small tube type has been adopted exclusively. It is stated that the life of these tubes exceeds five years.

During the period from 1898 to the present time the construction has included 18 battleships fitted with these boilers, to the extent of 183,220 indicated horsepower, while 70,280 hp. in the same ships is supplied by Scotch boilers. Three large cruisers built between 1900 and 1907 have 8000 hp. cylindrical boilers and 57,600 of Schulz-Thornycroft. Seventeen small cruisers built between 1901 and 1907 have 167,600 hp. in small tube boilers of this type, while gunboats, torpedo boats and launches, 28 in number, account for 93,560 hp. more of the same sort. The total horsepower of all these 60 vessels is 580,260, of which 78,280 is furnished by cylindrical boilers and 501,980 by the small tube type of water tube boiler.

Economy of Space by Using Steam Turbines.—In the original plans of the power house of the Twin City

Rapid Transit Company, Minneapolis, provision was made for five compound engine generating units of 3500 kw. each, of which three were installed in 1902 to 1904, and a fourth in 1905. The further expansion of the plant, in accordance with the original idea, could have been only 25 per cent. had the same type of apparatus been used. Instead of this, however, there were installed in 1906 two Curtis turbine generator sets of 5000 kw. each, these two occupying actually a smaller floor space than had been allotted to the fifth 3500-kw. engine generator. As a result, the capacity of the plant was increased from 14,000 kw. to 24,000, a gain of 71 per cent. Had full advantage been taken of the space allotted in the power house to the fifth machine an additional 5000-kw. set could have been installed, thus more than doubling the capacity, as compared with that of the reciprocating units of 1905 and before.

New Publications.

At the Works. A study of a manufacturing town, by Lady Bell (Mrs. Hugh Bell). Published by Edward Arnold, represented in the United States by Longmans, Green & Co., New York.

A close and sympathetic observer of the characteristics of the life and of the ambitions of the iron workers of the Cleveland District for many years, Lady Bell has striven hard to understand them and has recorded those observations in the volume just issued. As the wife of Sir Hugh Bell, whose family has been among the pioneers and has always been among the leaders in the Middlesbrough iron district, Lady Bell has had unusual opportunities, and it is evident from her work that she knows the Clarence Works and the large working population well. Her book confirms an impression created by casual visits to works in the Cleveland District that that working population is far from being homogeneous. We have been struck by the wide differences in physical appearance, with the number of men who looked anything but sturdy. It appears that the men as well as their families show mentally wide differences in character and capacity. That is shown in Lady Bell's chapters on Recreation and on Reading and on Drink, Bathing and Gambling.

Lady Bell's data relative to the expenditures and the receipts of the workman are rather discouraging, since they show that earnings in many cases are inadequate, even when there is little evidence of luxury or extravagance, but it is in her discussion of the wives and daughters that at least a part of the resulting misery is explained. As administrators of the common fund, the wives are very frequently inexperienced and careless, although they struggle against very adverse conditions. It is this part of the book—that which deals with the condition, the opportunities, the character, the shortcomings and the triumphs of the wives and daughters—which is deeply interesting.

Der Eisenbau (Iron Construction). By Luigi Vianello. Published by R. Oldenbourg, Munich, Germany. Price, 17.50 marks.

This elaborate work is the fourth of a series of works published by Oldenbourg, under the general title of the Technical Hand Library. It is designed to meet the requirements of the bridge builder and the structural engineer, and somewhat curiously begins with a mathematical section. This is followed by chapters on mechanics, on statics and on girders from the theoretical point of view. There is also an elaborate discussion on practical features.

The Colorado Fuel & Iron Company, Denver, Colo., on June 1 opened its own offices in the Chamber of Commerce Building, Portland, Ore., in charge of G. M. Whitson, division sales agent.

The Salisbury Steel & Iron Company has decided to build a railroad extension, 5 miles in length, to connect its iron ore mines with Dolgeville, N. Y., where a spur belonging to the New York Central ends.

The Machinery Trade.

NEW YORK, June 5, 1907.

The aggregate of business booked the past week was large, it being quite up to the average of that of the previous weeks, and, like it, was made up almost entirely of orders for small and medium sized lots of tools. It has been some time since any \$100,000 orders were reported placed with a single house in this district, the buyers evidently preferring to scatter their orders, so that they can secure the machines more promptly. The question of delivery has been a serious one with both buyers and sellers, and while the latter have been doing an unprecedented business, they claim that their sales would be larger could they get the tools to sell. This difficulty now seems in a fair way to become more aggravated by the strikes of machinists that have occurred in various localities. As yet no alarm is felt over the labor situation, nor are there indications that the strike will become general; but it is certain that these disturbances will adversely affect deliveries, which are already so far in the future. In plants that are booked ahead for months, a shut-down of only a few days is likely to cause considerable delay in deliveries. Inquiries have been received from the Pennsylvania Railroad for about a dozen tools. These, with the lists sent out by the Seaboard Air Line and the Norfolk & Western Railroad, represent a good amount of business to be placed. Aside from these no large inquiries are reported.

The railroads seem to be buying more liberally than the trade anticipated, and a prominent New York machinery man, who is close to railroad affairs, declares that some of the Southern roads will shortly make additional purchases. There has been considerable scattered buying from railroads of late, which indicates that shop men have brought it to the attention of their managers that repair equipment is needed. It is said that the majority of railroads with increased rolling stock to take care of, have found their repair equipment inadequate. Summed up by the gentleman quoted above, who visited several large railroad shops throughout the East and South recently, is that machinery houses, catering particularly to railroads, will have more to do this summer than was expected from the outlook of a month ago.

The best indication that machinery manufacturers in Europe are busy is shown by the visits of numerous representatives of foreign machinery houses, who have been sent here to make connections with a view to selling American tools and other equipment in Europe. During the recent conventions in the trade a number of foreign machinery representatives were in attendance, and they afterward visited plants of many machinery manufacturers. The general opinion on the part of the visitors is that there will be a strong demand for equipment for Europe for some time to come, and they all seemed anxious to establish good selling connections.

The longshoremen's strike in New York has been seriously felt by the export trade, for the reason that considerable machinery which was badly needed by foreign customers has been held up. Under existing conditions those who buy for export have had to content themselves with long delivery terms, and consequently ordered equipment has arrived in New York at the last possible moment for shipment abroad, to arrive in time to fulfill the selling agent's agreement with his customers. Consequently, at the outbreak of the strike there was a lot of machinery in New York ready for transit to Europe, which under normal conditions would arrive just about in time to make the exporters' promises good. Much of the machinery was held up on the docks, resulting in angry protests from anxious customers, and much work on the part of the exporters in looking after the equipment awaiting shipment.

Representatives of the Federal Government of Japan are visiting this country for the purpose of inspecting American manufacturing plants, with a view to making machinery purchases later on. Among them are the engineer-captain of the Imperial Navy of Japan, a representative of the Agricultural Department and engineers connected with the Kawasaki Dock Yard Company and other prominent men. It is understood that several of the party are expected in New York shortly, and they will visit large manufacturing plants in this vicinity. While it is stated that the visit of the Japanese will result in some buying, it is highly probable that the purchasing will be done after they have left this country, as invariably when such purchases are made orders are placed through Japanese export houses here with which the interests the visitors represent are closely connected.

Pennsylvania Railroad Machinery Requirements.

Aside from the purchase of two direct lift plunger hydraulic freight elevators, with a capacity of 5000 lb. each, at

a speed of 125 ft. per minute, and operating with a water pressure of 500 lb. per square inch, there has been little or nothing emanating from the purchasing department of the Pennsylvania Railroad Company for the last few weeks. The present week, however, the following inquiries for tools and machinery have been sent to the trade: One bolt cutter, having capacity to thread from $\frac{3}{8}$ to $1\frac{1}{2}$ in., inclusive, complete with two heads, automatic for opening and closing, rotary oil pump, countershaft and all necessary wrenches and dies, the bids to state the number of sets and size of dies, etc.; one nut facer, having capacity of from $\frac{1}{2}$ to 2 in. nuts, complete with countershaft, wrenches and all accessories; one universal saw bench, to take stock at least 20-in. wide and having suitable saws to rip or cut pieces 5-in. thick, to be equipped with one cross cut, one rip saw and countershaft, together with the necessary wrenches, &c.; one automatic rip and cut off circular saw sharpener, capacity 6 to 50 in., made to bevel the saw teeth on both front and back, with belting on wheel, range of arbor diameters 1 to $1\frac{3}{4}$ in., machine to be complete with necessary wrenches, &c.; one wood turning lathe, with iron bed, hand feeding carriage and compound swivel rest, to swing 20 in. over bed and at least 17 in. over carriage and to turn 9 ft. between centers, machine to be equipped with countershaft, necessary wrenches, &c.; one 20 in. x 6 ft. screw cutting engine lathe, taper attachment, countershaft, all necessary wrenches, &c.; one 24 in. x 6 ft. screw cutting engine lathe, taper attachment, countershaft, all necessary wrenches, &c.; four-row independent chuck; one 3000-lb. single frame guided ram steam hammer, distance from center of die to frame 38 in., from floor to under side of frame 63 in., stroke 42 in., to have one pair of steel dies, oil pump and steam and exhaust pipe nipples; one 36 x 36 in. x 10 ft. metal planing machine, with two heads on cross rail and two heads on uprights, to have power and hand feed and parallel line shaft, to be belt driven and to have countershaft and all necessary wrenches, &c.; one 42-in. vertical boring mill, to be motor driven, hub facing attachment, power crane and brake to stop machine, motor to be supplied with oil auto starter, all necessary wrenches, &c.; one plain radial drill, to drill to the center of 120-in. circle, largest size hole 4 in., taper in spindle, Morse No. 5, belt driven, to have countershaft, all necessary wrenches, &c.; two 26-in. engine lathes, belt driven, taper, to be equipped with four jaw independent chucks and to have countershaft and all necessary wrenches.

It is probable that before long the Erie Railroad will come into the market for machinery to equip shops at Marion, Ohio, as the company has arranged to move its plant at Galion, Ohio, to the former city, where a much larger system of shops will be established. The Erie has been negotiating for some time with a committee from the Marion Commercial Club, with a view to securing inducements from that city for locating large shops there, and an arrangement has been reached whereby a tract of land about a city block in size, on which are several abandoned factory buildings, is to be transferred to the railroad company. These buildings will be put in repair and arranged for use as railroad shops, and some other structures will be erected. Plans, however, have not progressed far enough to warrant a statement as to just what will be done in that direction. The reason for the change is largely due to the fact that Marion has become an important junction with several other roads, and at present a large transfer yard, classification yard and switch yard are located there. Under this arrangement it has been necessary to send cars which have been found to be in need of repair from the yards to Galion, 21 miles away, and the work of transferring disabled cars from the various sections of the 25 miles of switch tracks at Marion to the Galion shops was found to be decidedly unprofitable. Among other buildings there is a large two-story brick building on the property acquired by the Erie at Marion, and this will be put into commission at once, and it is expected that the shops will be moved during the summer. The preliminary plans for the improvements include a repair shop, car shop, boiler shop, power house, roundhouses, and, in fact, a good sized general railroad plant.

Plans are being prepared by the Royal Typewriter Company, 253 Broadway, New York, of which Allan A. Ryan, a son of Thomas F. Ryan, is president and treasurer, for the erection of a large plant at Hartford, Conn. The company has bought $5\frac{1}{4}$ acres of land on New Park avenue, Hartford, and it is intended to erect a large brick factory building, containing at least 250,000 sq. ft. of floor space. Beyond arranging the approximate size of the building, the company has made no plans for the structure or its equipment. It is expected that about \$500,000 will be spent on the plant, and it will be of sufficient capacity to turn out 25,000 finished typewriters in the first year. The company now has a plant at Bay Ridge, Brooklyn, where about 7500 machines a year are made. The engineering and mechanical details will probably be arranged from the Brooklyn plant, but that matter will not be gone into yet, and a statement regarding those details will appear later on.

General equipment is required by the Wales Foundry & Mfg. Company, New Brunswick, N. J., which was recently incorporated with a capital stock of \$50,000, and which will erect a new plant on 6 acres of land, recently purchased on

the Raritan River Railroad. Plans for the buildings are being prepared by George K. Parsell. The company will produce gray iron and brass castings. Charles T. Wales, a well-known foundryman of New Brunswick, will be at the head of the enterprise, who, with Dr. Henry H. Janeway of New Brunswick and A. C. Streitwolf, Jr., 42 Broadway, New York, constitute the Board of Directors.

C. V. Hessenbach, who is connected with the firm of C. L. Hessenbach, 111 East Thirty-first street, New York, is purchasing machinery for a structural iron plant to be erected on Bull's lane, near Hambury place, Newark, N. J. Mr. Hessenbach has purchased 2 acres of land there, and at first a plant 50 x 100 ft. will be erected, which will probably be extended later. The amount of horsepower to be used has not been decided as yet, but it is stated that probably an electric plant will be installed. In addition to the power equipment, it is understood that some fabricating equipment is needed. While Mr. Hessenbach has an office at the New York address, he is spending much of his time in Newark at the site of the proposed plant.

The National Lead Company, 100 William street, New York, has purchased a large tract of land adjoining its Chicago plant with the intention of extending its works there. It is stated that the contemplated improvements will cost about \$250,000, but no plans have been drawn as yet and no equipment has been bought. Those details, it is stated, will not be put in shape for announcement for two months at least.

The John Inglis Company, Toronto, Ont., is building a new machine shop, 100 x 225 ft., and blacksmith shop and pattern storage building, 42 x 100 ft. The company has not yet decided upon the new machinery it will require.

Indications are that the Rapid Transit Commission will have completed plans for the long distance subway in Brooklyn by July 1, so that when the new commission comes in at that time, matters will be in such shape that it can immediately ask bids for the construction of the subway. The route of the proposed subway is from Chrystie street, Manhattan, over the new Manhattan bridge and through the extension of Flatbush avenue and Fourth avenue to Coney Island, with a spur to Fort Hamilton. It is estimated that the subway will cost in the neighborhood of \$21,000,000.

Business Changes.

The Vandyck-Churchill Company is now located in its new quarters, 91-93 Liberty street, New York, where it has offices and showrooms which are fitted to take care of its increased business. The company has about 5000 sq. ft. of floor space, and some 4000 sq. ft. of it is used for showrooms and for the storage of equipment held for filling demands for early delivery. The front of the building is used for the display of machine tools, and at the rear are the offices of the members of the firm and the executive heads, besides a large general office. The names of the office staff are displayed in attractive lettering on the desks in the general office, which feature lends a personality to the staff and facilitates the business of visitors. The offices, which are elegantly fitted up, make one of the most attractive machinery headquarters in the city.

The DuBois Iron Works, manufacturer of gas and gasoline engines, pumping machinery, &c., DuBois, Pa., has appointed as its representatives the Aumen Machinery & Supply Company, 324 North Holliday street, Baltimore, Md.; John H. Seibert, 116-120 Washington street, Reading, Pa.; Peerless Belting Company, 76-78 Main street, Buffalo, N. Y.; F. H. Brown Machinery Company, Park Building, Pittsburgh, Pa.; Scranton Supply & Machinery Company, 131 Wyoming avenue, Scranton, Pa.; W. M. Mentz, Gap Mills, W. Va., and Charles Willemsen, 810 North Sixth street, St. Louis, Mo. At Baltimore, Reading, Scranton, Pittsburgh and Buffalo a line of engines will be carried for exhibition purposes and for demonstrating to purchasers. The company has appointed as special representatives for this territory, H. J. McCormac, who will travel from the head office and works at DuBois.

The Goubert Mfg. Company, maker of the well-known line of Goubert water tube feed water heaters and Stratton steam separators, has recently removed its offices from 85 Liberty street to the new West Street Building, Cedar and West streets, New York.

Dodge & Day, engineers and constructors, whose main offices are in the Drexel Building, Philadelphia, have extended their business by opening an office in the United States Realty Building, 111 Broadway, New York, which has been placed in charge of Robert T. Lozier, who has for some years past been prominently connected with electrical industries. The new office has already closed contracts for several industrial and public utility plants.

The Buffalo Forge Company, Buffalo, N. Y., has moved its Pittsburgh office from 1101 Diamond Bank Building to 613 House Building. E. H. Leadbetter is manager.

The A. Leschen & Sons Rope Company, St. Louis, Mo., has moved its New York office from 163 and 165 Washington street to the West Street Building, West and Albany streets.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 4, 1907.

Business in the local machinery market, particularly in the line of so-called standard machine tools, was hardly as good as expected during the month of May. Buying declined in a number of cases as the month advanced, and recently the demand has been rather inactive. There was some falling off in the amount of business done in small lots and single tools, but the total sales for the month were brought up to a fair average by a few large orders, which in most cases had been hanging up for some time and which were finally closed during the latter part of the month. Special tools, however, had quite a large sale during the month just passed, and manufacturers and dealers report record sales in some instances. During the past week machine tool dealers report business to have been particularly quiet, an apparent lull having developed in the buying of nearly all classes of tools. No special reason has been advanced for this condition, and it is generally thought to be one of the short periods of inactivity which frequently develop between buying movements.

Inquiries, while not as numerous as some months ago, are still in good number, but are rather inclined to be hard in closing up. Specifications for a small lot of tools and other equipment have been sent out by the Pennsylvania Railroad, and several concerns anticipate placing some fair orders at an early date. A good volume of business is expected from the several Southern railroads which now have specifications before the trade, and it is generally considered that there will be quite a material increase in the volume of business in the near future. The right of eminent domain given to electric railroads by act of the recent State Legislature will, it is expected, give quite an impetus to the building of electric roads, not alone in this district, but all over the State, and a large volume of business, both direct and indirect, will no doubt ultimately come to machinery manufacturers and merchants from these extensions and new roads.

Manufacturers are as a rule fully occupied, sufficient business being already on the books to keep them actively engaged in all departments for some months. Deliveries have improved in some cases, and it is now possible to get tools of certain classes inside of three months' delivery. Heavy special tools, however, are still subject to more extended deliveries. Stocks on dealers' floors are getting in much better shape, and spot deliveries can be had on certain tools which six months ago could not be had inside of that time.

There has been but little change in the foreign demand. A few scattered sales of machine tools are reported, with a somewhat better demand for special tools. A fairly good foreign business continues to be done in power transmission machinery and machine shop specialties.

Builders of heavy engines and complete power plants note a better demand. That for equipment of the medium horsepower is not so active, while the demand for the smaller engines and boilers is rather dull.

Second-hand machinery dealers report quite active conditions, the best demand being for the heavier and better grades of tools. Second-hand boilers and engines are subject to good inquiry, and some quite satisfactory sales have been made.

The iron and steel casting plants continue quite busy. In some cases deliveries are as hard as ever, but in others better shipments are reported. As a rule, almost as much business is offered as can be handled satisfactorily, and the tonnage output continues very large.

Preliminary work in connection with the abolishment of the Ninth street grade crossings of the Philadelphia & Reading Railway Company has begun, and plans are being hastened so that bids for the general construction work can be advertised for at as early a date as possible.

Bids for the construction of 38 branch sewers in different parts of the city were opened recently by the Bureau of Surveys, City of Philadelphia. This work is estimated to cost \$100,000 and upward. About 50 bidders submitted estimates, the bids being made on the individual pieces of work. The bids were ordered scheduled, and it will be some days before the announcement of awards will be made.

It is stated that the Philadelphia & Reading Railroad will, by the issue of \$5,000,000 worth of trust equipment certificates, add 4900 cars and 30 locomotives to its rolling stock. It is understood that most of the orders for this equipment have already been placed. The cars are largely of the steel gondola and box types, and will increase the number of these cars in service by 20 per cent.

The American Pulley Company reports a good average month's business during May. Export trade has been fully up to the average and extensive shipments of pulleys have been made to England and Continental Europe. The domestic demand has improved somewhat, particularly for pulleys of the larger sizes. With recently added facilities, better

deliveries can be made, although more or less difficulty is experienced in obtaining raw material from the steel mills. Among recent domestic deliveries were several carload shipments, one for Chicago, one for Cleveland and one for San Francisco. Shipments in good quantities have also been made to customers both in the New England and Southern States.

I. H. Johnson, Jr., & Co., Incorporated, continue busy in all departments. There has been a good demand for lathes of all sizes, and orders have been booked for a number of 20, 24, 27, 30, 36, 48 and 60 in. tools, more than half being of the motor driven type. Two 60-in. lathes, with beds 41 ft. long, are in course of erection for one customer, as are also a number of other heavy tools. Two lathes, each 48-in. swing, with 30-ft. beds, were recently shipped to Roumania, while numerous shipments of smaller sized tools have been made to different domestic customers.

The Espen-Lucas Machine Works has booked a large volume of business, and the last few months have been the best that the concern has ever had. There has been a good demand for horizontal floor boring, milling and drilling machines, portable boring machines, slab milling machines and steel foundry I-beam and bar types of cold saw cutting off machines, and many satisfactory orders have been booked. The plant is being operated on double turn so as to make deliveries promised. Recent deliveries by this concern include a boring mill weighing over 22,000 lb. for a New England concern, two 50-in. cold saw cutting off machines for parties in the Pittsburgh District, and a slab milling machine and a number of various sized cold saw cutting off machines for local and nearby parties.

The E. H. Mumford Company, manufacturer of foundry molding machines, notes an increasing demand for the standard types of machines, as well as for those of the Pridmore rockover type and Rathbone multiple molding machine. Sales during May were equal to, if not better than, the best previous month in the history of the company's business, and include, among others, one lot of 11 machines of the power ramming, split pattern type for one concern. Two power ramming machines were also ordered by the Pennsylvania Railroad for its Altoona shops, and two other machines were ordered for shipment to Montreal. Quite a good demand has also developed for the company's new loose ring power sand riddle. Deliveries during the past month were large, including machines of almost every class, for customers both in the East and West.

Chicago Machinery Market.

CHICAGO, ILL., June 4, 1907.

A noticeable increase is apparent in the number of tools seen on dealers' floors, but upon examination it is found that in almost every case the accessions comprise mainly second-hand tools. A majority of these are, of course, not up to date machines, but under present conditions are salable stock, and it is evident that no difficulty is experienced in moving them. Favored by the extreme scarcity of new tools, this trade has for some time enjoyed a degree of activity seldom, if ever, paralleled in the history of the business. Though in no other line has the demand been so insistent and vigorous as in machine tools, it has, nevertheless, extended with greater or less force to all kinds of machinery equipment. It is believed, however, that the maximum of this movement has probably been reached, for as factories begin to overhaul the accumulation of incoming orders, and are able to again make shipments with reasonable promptness, a diminished demand for second-hand machines will follow as a natural result. Increased output capacity coupled with a lessened volume of new business is gradually working to that end, though the progress so far made is too small to be very noticeable in its effects. But barring the development of labor troubles, that in some manufacturing centers threaten to interfere with production, there should be definite improvement to report before long.

Something of a revival of railroad interest in the machine tool market was indicated this week by the appearance of a list of requirements from the Norfolk & Western Railroad and two or three others of less importance. It is also reported that the Big Four Road, which recently completed the purchase of a list of tools for the equipment of its new shops at Beech Grove, near Indianapolis, Ind., is about to issue an auxiliary list for the same plant. Of the extensive electrical equipment required for these shops a considerable portion is yet unpurchased.

In spite of the abnormally high costs of production, which, perhaps, have borne more heavily upon electrical machinery than most other lines, makers of generators, motors and kindred appliances are not lacking orders to fully engage productive capacities. Every modern plant in-

stallation of whatever kind is incomplete without its quota of electrical equipment, and quite frequently it constitutes a very considerable portion of the whole. The tendency toward individual motor driven units is productive of much new business in this field and furnishes a pointed illustration of the expansiveness of the line.

Machinery Requirements of the Berlin Machine Works.

Reference was made in these columns May 23 to a list of tools for the equipment of a new plant to be built in Canada by the Berlin Machine Works, Beloit, Wis., on which dealers were figuring. No haste has been displayed in contracting for these tools, and it is believed that orders for very few, if any, of them have yet been placed. A list of the requirements now before the dealers is given below:

Two metal planers, 20 x 20 in. by 5 ft. bed; two 20 x 20 in. by 8 ft.; two 36 x 36 in. by 10 ft.; two 30 x 30 in. by 8 ft.; two 48 in. by 12 ft., widened to 74 in.; one 48 in. by 16 ft., widened to 60 in.; one 54 x 42 in. by 8 ft.; one 36 in. by 10 ft., widened to 48 in.; one lathe, 5 in. by 10 ft., automatic; one 8 in. by 6 ft., automatic, with 18-in. chuck; one 24-in. swing turret lathe, power movement, carriage cross feed and triple speed friction; one 28-in. swing turret lathe, power movement, carriage cross feed and triple speed friction; two chucking lathes; two screw machines; one double axle lathe, with short head, about 7 in., for handling 9-in. blocks; one 30 in. by 18 ft. hollow spindle back geared engine lathe; one 10-in. hollow spindle back geared toolroom lathe; one 21 in. by 14 ft. hollow spindle back geared engine lathe; two 21 in. by 14 ft. hollow spindle back geared engine lathes; two 21 in. by 12 ft. hollow spindle back geared engine lathes; two 16 in. by 10 ft. hollow spindle back geared engine lathes; three 30-in. pulley lathes; two 4-ft. arm plain radial drills, with No. 5 Morse taper; one 30-in. arm plain radial drill, with No. 4 taper; four 20-in. vertical square base lever and hand wheel feed; two 21-in. power feed three-spindle vertical; one 14-in. sensitive drill; four 26-in. upright square base drill presses, back geared, hand and power feed; one 8-ft. boring mill, arranged for induction motor drive; one combined vertical and horizontal spindle milling machine; one No. 3 universal toolroom; one No. 6 vertical spindle milling machine, with rotary attachment; one 15-ton foundry electric crane; one 10-ton electric machineshop crane; one pressure blower, 66-in. cylinder, 45 cu. ft. capacity; one steel cupola, 84-in. shell, 30 ft. high; two steel cupolas, 66-in. shell, 47 ft. high; one 2-ton electric elevator; 36 ladles, 60 to 6000 lb. capacity; five tumbling barrels, small, medium and large size; one 20-in. disk grinder; one cut off machine, capacity 5-in. round stock; one power hack saw; one keyseater; one pulley tapping machine; three arbor presses; one air compressor, direct connected to induction motor, capacity 100 ft. free air per minute; one 8-in. belt lacer; one oil and chip separator; five Babbitt melting furnaces; one 130-lb. power hammer; one combination punch and shear; two down draft blacksmith forges; two blacksmith angles.

Work on the superstructure of the Lyman Trumbull Manual Training High School, Chicago, has been begun, and contracts for the engines, generators, boilers and ventilating system have been let. This structure will be of unusual size, being, it is said, the largest building of its kind in the country. It covers practically half a city block, the foundation lines being 175 x 325 ft. Its equipment throughout will be most complete and modern. The basement floor will be occupied by well fitted and completely equipped machine, foundry, smith and forge and woodworking shops, together with the boiler and engine rooms. A large amount of tools and machinery will be required for these shops, a list of which is now being prepared and will soon be issued. The engine contract was secured by the Russell Engine Company, which will install three 18 x 24 in. four-valve Russell automatic engines, direct connected to Western Electric generators of 400-kw. capacity. Heat and ventilation will be supplied by a system designed by T. J. Waters, chief engineer of the Board of Education. The contract for installation of this system was let to Rudolph Wiersig, 1238 North California avenue, Chicago. Steam will be supplied from a 1000-hp. battery of Bonus-Freeman water tube boilers in three units. Electric current for lighting will be furnished by the school plant.

The Globe Special Machinery Company, 11-19 South Jefferson street, Chicago, incorporated with a capital of \$30,000, has been organized for the manufacture of special machinery, especial attention being given to the manufacture of electrotype and stereotype machines. M. J. O'Donnell is president; Fred Stone, treasurer, and John Ekstrom, manager.

Bonds for the installation of a municipal electric light plant have been approved and issued by the Board of Aldermen of Milwaukee, Wis. A site has been bought at a cost of \$65,000, and the entire expenditure contemplated will reach \$750,000. Of this sum \$250,000 will be devoted to plant equipment, which is designed to represent the latest and best machinery and appliances procurable for the generation of electricity. Plans for the plant have been drawn by Robert W. Hunt & Co., Chicago, who are retained as

consulting engineers, and are now in the hands of the Board of Public Works. The use of gas engine motive power is being considered, and the boards of Aldermen and Public Works have decided to advertise for bids on gas producers and gas engines. The undertaking is of notable importance as bearing upon the furtherance of the municipal ownership idea, and will be watched with keen interest by both advocates and opponents of the system.

As a logical outcome of the enormous increase in the use of crushed stone for the manufacture of Portland cement and other purposes a heavy demand for stone crushing machinery, including screens, elevators and conveying machinery, has resulted in many new plants of considerable magnitude being installed in various parts of the country, which have involved large outlays for such equipment. One of notable size has recently been completed at Gary, Ind., by the Dolese & Shepard Company. The principal building of this plant is 40 x 317 ft., and is supplied with Gates breakers, made by the Allis-Chalmers Company, the largest having a capacity of approximately 3000 tons of crushed rock in 10 hr. A large part of the product of this plant goes to the blast furnaces of the Illinois Steel Company for use as flux, while the remainder is used for macadam and concrete and other work.

The Page-Storms Drop Forge Company, Springfield, Mass., has placed an order for a 300-hp. Weber triple cylinder vertical gas engine, with twin suction gas producers, which will furnish motive power for its new plant at Chicopee Falls, Mass. The fuel used in these producers will be buckwheat anthracite coal. The equipment will be installed by the Weber Gas Engine Company, Kansas City, Mo.

Cleveland Machinery Market.

CLEVELAND, OHIO, June 4, 1907.

While the local machine tool dealers have booked a satisfactory number of orders during the past week, the volume of their business was considerably less than it was a few weeks ago. Dealers do not look for as heavy a demand from now on as they had during the early part of the year, but seem confident that their sales will continue good for some time at least. Inquiries continue to come in in satisfactory numbers, and many users of machine tools seem satisfied with the prospects of the continuance of the present business conditions by placing orders for tools for delivery in the fall to increase the capacity of their plants. The only thing that is causing any anxiety at present among local machine tool dealers is the strike of the union machinists. If the differences between the machinists and their employers are not settled promptly, the machine tool dealers fear that their business will be seriously affected as far as local sales are concerned. A number of new projects, requiring quite a large amount of tools and machinery, are under consideration, but it is believed that the scarcity of capital at the present time is temporarily delaying the launching of new enterprises. Local machine tool dealers say that they have failed to see any improvement in deliveries, and they are selling practically nothing for shipment before along in the fall.

The contract for the structural steel work on the five shops, additional to the main shop building, for the Hocking Valley Railroad, at Logan, Ohio, has been awarded to the Mount Vernon Bridge Company, Columbus, which secured the contract for the main shop. The buildings will be of structural steel and brick. They will include a power house, 60 x 120 ft.; carpenter shop, 60 x 120 ft.; office and store-rooms, 25 x 50 ft.; pipe and tin shops, 30 x 50 ft.; lumber dryers, 40 x 50 ft. The shops will be equipped with modern car repairing machinery.

The Park Drop Forge Company, Cleveland, was incorporated a few days ago, with a capitalization of \$100,000. The men back of the company are interested in the White Sewing Machine Company, and a plant will be erected during the summer, adjoining the latter's new automobile plant. The forge company will make forgings for the automobile plant. The new company, which placed orders during the past week for several thousand dollars' worth of machine tools, including drop hammers, a 20-in. lathe, planer, shaper and drill press, is in the market for other equipment for its machine shop. The organization of the company has not yet been effected nor plans completed for the plant.

The Standard Welding Company, which has commenced the erection of a large plant on West Seventy-fourth street, has practically decided to build its own power house instead of securing electrical power from a commercial company, as had been intended. The company has plans prepared for a power house about 80 x 100 ft., and expects to be in the market soon for a 300-hp. and a 500-hp. engine and electric generators of corresponding power. In addition to its main plant it is having plans prepared for buildings for its annealing, nickel plating and inspecting departments.

The Lannert Company, manufacturer of laundry markers and fire alarm boxes, is building a new three-story factory building, 44 x 44 ft., on St. Clair avenue. It is in the market for a gas engine. Other machinery equipment has been contracted for.

The Farmers Fence Company, Bellefontaine, Ohio, is building a new plant, and is in the market for a lathe, milling machine and shaper.

The Claudy Desk Company has been incorporated in Zanesville, Ohio, with a capital stock of \$75,000, to manufacture a new patent school desk. The company intends to make its own castings, and is planning the erection of an up to date foundry for that purpose.

The Power Electric Company has been organized in Canton, Ohio, for the manufacture of electrical machinery. The new company is a combination of the interests of M. S. McKee of Altoona, Pa., and the Goughnour Electrical Company of Canton. It is capitalized for \$100,000, and it is understood that a new plant will be erected at once. Charles Goughnour is president; E. M. S. McKee, vice-president; W. W. Irwin, secretary and treasurer, and Charles A. Dillon, superintendent.

The W. M. Pattison Supply Company has taken the agency of the automatic gear hobbing machines imported by Schuchardt & Schütte, 136 Liberty street, New York.

At a recent meeting of the stockholders of the Columbus Forge & Iron Company, Columbus, Ohio, the Board of Directors was authorized to increase the capital stock from \$125,000 to \$200,000. The company's business has grown to such an extent that additional capital has been found necessary.

The Smith Agricultural Chemical Company, Columbus, Ohio, will soon let contracts for 14 new sulphuric acid furnaces, which will give a total of 50 furnaces, and make it one of the largest acid manufacturers in the country.

The Ashtabula Carriage Bow Company, Ashtabula, Ohio, has changed its name to the Ashtabula Bow Socket Company. P. H. Pfaff is president of the company and F. K. Lewis secretary.

New England Machinery Market.

WORCESTER, MASS., June 4, 1907.

Buoyancy characterizes the machine tool trade, the business of the past week seeming to have had a most favorable effect upon the dealers. Any feeling that may have existed that things were dropping off has been overcome by the continued strong demand for machinery, and by the footing up of the totals for May, which revealed larger figures than were generally expected. Every house did a first rate business, and with a few it was exceptional. One concern which has not until quite recently pushed the machine tool branch of its business made of May the largest month in its history.

The manufacturers are strongly confident. A number of machine tool builders of the Middle West have been in New England in the past week, and all bring the same tidings, corroborating by word of mouth what they have been writing to their Eastern representative; that business continues unabated, with no gains in deliveries and no prospects of improvement in this direction. The New England manufacturers make the same statement, there being no exception to the rule.

The manufacturers continue to assert that they would rather welcome a slight drop in demand. Few realize how much more expensive it is to manufacture under forced conditions than during normal times. This is true not only in the shops, but in the selling end of the business. Each item of the expense account mounts higher in proportion to business done as demand increases, after it has passed a given point. It is easier to sell tools, and it would seem that less cost would be involved in this department. But manufacturers have found it otherwise. And no one can doubt that where shops are rushed beyond normal economical capacity there must be higher costs.

The supply dealers report that their business has shown an increase of late as compared with last year. This is very significant as indicating general prosperity in all lines of manufacture. These dealers say that there seems to be no exception in the demand from the various lines of manufacturing. In other words, the increase in sales is generally distributed among all classes of customers.

A noticeable increase in demand with the machine tool dealers is for more or less special tools. This does not mean that the manufacturers are opening their order books for special machines, but that machine tools other than the common standard types—machines which do some special work—are being bought in greater number than has been the rule of late months.

The market for power plant equipment in New England is probably as great as it was a year ago, and some manufacturers and dealers believe it is even better. Many works have outgrown their power facilities, because of extensions of manufacturing facilities during the past year, making necessary increases of power, which in no few instances mean

entirely new power plants. The boiler builders are very busy. The strike of boiler makers at Boston promises to have no very serious results on the works, some of the men having returned, while the places of others are being filled. Boiler makers all through New England report an increase in orders of late.

The United Shoe Machinery bill, which has been alluded to in this column, has become a Massachusetts law, the signature of the Governor having been affixed to it. As this means an end to the lease of the United Shoe Machinery Company, Beverly, under which a user of its machines could install none of other make, it is expected that the independent companies, most of which are rather in the embryo state, will now develop, bringing them into the market for machinery and other equipment. The bill applies generally to this class of lease, but so far as can be learned there is no business other than that of the United Shoe Machinery Company that is affected.

The Keith Car & Mfg. Company, Sagamore, Mass., is to make great improvements and enlargements at its works, and will engage in the manufacture of steel freight cars on a large scale. Preparations are far advanced as to details, and the underpinning of one of the new buildings is already started. There will be two main buildings, one 60 x 1100 ft., the other 60 x 900 ft. There will be a large power house, 150 x 400 ft. The first two buildings will be constructed of steel and corrugated iron, and the power plant will be of concrete. The contract for the buildings, which has been placed, calls for five blocks of 40 tenement houses each, and various storage and similar structures. It is planned to procure a productive capacity of 20 cars daily, of the standard steel frame pressed steel type, and it is understood that one large contract has already been placed with the company by the New York, New Haven & Hartford Railroad. The plant is on the Old Colony Division of that road, and not far from the line of the proposed Cape Cod Canal. The business is a very old one. Wooden freight cars have been built for years, the New Haven road having been a pretty constant customer. It is understood that the contract for the power equipment has been placed and some contracts for machinery, &c. The town of Sagamore is a small one, and the new works will mean the establishment of a considerable village in itself. State Senator Eben S. S. Keith is at the head of the business.

The Petremont Boat Company, New Haven, Conn., which builds yachts and conducts a marine railway, is building a new workshop, 40 x 80 ft., for which considerable woodworking machinery is required, and plans to establish in the near future a fully equipped machine shop, which will mean the purchase of a complete line of tools. The company has just increased its capital stock from \$5000 to \$55,000. The improvements in shop facilities are a part of a plan of enlargements of the general plant, including the construction of a bulkhead 85 x 150 ft., and the dredging of a large basin for the storage of yachts.

The Wolverine Motor Works, Incorporated, Bridgeport, Conn., manufacturer of gasoline and kerosene engines, is erecting an addition to its recently completed plant, 60 x 210 ft., one story. The original building is of the same dimensions, with a second story at one end for office purposes, so that the addition practically duplicates the plant. The building will be of concrete block construction and saw tooth roof.

The Scoville Mfg. Company, Waterbury, Conn., manufacturer of brass and brass goods, has begun the construction of a brick and concrete addition to its works, 46 x 228 ft., one story and basement. The new space will be used for increased manufacturing facilities in the company's general manufacturing line.

Beseman & Bostwick, Hartford, Conn., manufacturers of architectural sheet metal work, are to build a new factory, 40 x 84 ft., five stories. They will require new machinery, including a 10-ft. power cornice brake with 10-hp. electric motor to operate it, a 10-ft. shear and some other related machines. The firm will occupy two floors and will rent the remainder for light manufacturing.

The Norwood Engineering Company, Florence, Mass., manufacturer of hydrants, filters, elevators, paper finishing machinery, &c., has come to an agreement with the town under which it will complete a new building, work upon which was suspended waiting the settlement of the question of a spur track location. The company has under contemplation the establishment of branch works somewhere in the West. It states that while it is considering this question at the present time, it is not in a position to give further particulars, as certain matters are still in an unfinished state.

W. & B. Douglas, Middletown, Conn., manufacturers of pumps and pumping machinery, are erecting an addition to their works, which will be used as a cupola house for the foundry. In it will be installed the old cupola and also a new 76-in. Paxson-Colliau. The change will double the present capacity, which is necessary because of the increase in business. The business is in its seventy-fifth year, and strong prosperity serves to fitly celebrate the anniversary.

The Acetylene Lamp Company, 50 University place, New York, has leased the three top floors of the four-story building and the top floor of the three-story building of the Spring Perch Company, John street, Bridgeport, Conn., and will manufacture, finish and ship its product from that point. No stamping machinery will be purchased in the beginning, as most of this work has been done by the Bridgeport Brass Company, but there will be soldering, assembling, buffing, plating, finishing, lacquering and some machining.

Government Purchases.

WASHINGTON, D. C., June 4, 1907.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until June 25 for the following machinery for the Mare Island Navy Yard: Schedule 892, motor generator set; schedule 894, shaper and drill; schedule 895, hand power brake, shears, flanging machine, blowers; schedule 897, planer.

The Isthmian Canal Commission will receive bids until June 12, Circular No. 368, for hoisting engines, lathes, &c.

The Isthmian Canal Commission will receive bids until June 28, Circular No. 369, for suction dredges.

The following bids were opened May 28 for supplies for the navy yards:

Bidder 14, The Browning Engineering Company, Cleveland, Ohio; 16, Bridgeport Safety Emery Wheel Company, Bridgeport, Conn.; 19, Becker-Brainard Milling Machine Company, Hyde Park, Mass.; 22, Brown Hoisting Machine Company, New York; 23, Berlin Machine Works, Beloit, Wis.; 28, Bullard Machine Tool Company, Bridgeport, Conn.; 30, Brown & Sharpe Mfg. Company, Providence, R. I.; 44, Chicago Pneumatic Tool Company, New York; 65, E. I. du Pont de Nemours Powder Company, Wilmington, Del.; 66, Dodge Cold Storage Company, Nicetown, Philadelphia, Pa.; 73, Walter H. Foster Company, New York; 74, Fox Machine Company, Grand Rapids, Mich.; 77, Fairbanks Company, New York; 78, Frevert Machinery Company, New York; 87, Garvin Machine Company, New York; 89, I. & E. Greenwall Company, Cincinnati, Ohio; 96, Hendy Machine Company, Torrington, Conn.; 100, Industrial Works, Bay City, Mich.; 110, Ingersoll-Rand Company, New York; 121, Knox & Bro., New York; 136, Mosher Water Tube Boiler Company, New York; 143, Manning, Maxwell & Moore, New York; 145, Manhattan Supply Company, New York; 146, Montgomery & Co., New York; 147, Motley, Green & Co., New York; 166, Niles-Bement-Pond Company, New York; 174, George A. Ohle & Co., New York; 177, Oliver Machinery Company, New York; 184, Prentiss Tool & Supply Company, New York; 189, Pratt & Whitney Company, Hartford, Conn.; 210, Stoeber Foundry & Mfg. Company, Myerstown, Pa.; 232, Thornton Machinery Company, Providence, R. I.; 246, Vermilye & Power, New York; 267, Babcock & Wilcox Company, Philadelphia, Pa.; 268, Crescent Machine Company, Leetonia, Ohio.

Class 21. One 9-ton wheel mill for grinding gunpowder—Bidder 65, \$4750; 89, \$3803.

Class 22. Two horizontal boring, drilling and milling machines—Bidder 166, \$33,800.

Class 23. One surface grinding machine—Bidder 30, \$634.

Class 32. One universal table—Bidder 166, \$825.

Class 33. One molding machine, complete—Bidder 23, \$1494.

Class 34. One band sawing machine—Bidder 177, \$751, \$730, \$701 and \$680; 268, \$500.

Class 36. Two pneumatic yoke riveters—Bidder 44, \$500.

Class 37. One automatic wood boring machine—Bidder 147, \$225; 246, \$183.50.

Class 38. One radial drill—Bidder 166, \$4900.

Class 41. One motor driven pipe bending machine—Bidder 210, \$1525.

Class 43. Four water tube boilers—Bidder 136, \$7800; 147, \$3990 and \$5040.

Class 62. One boiler—Bidder 267, \$3381.

Class 208. One slitting shear, one circular shears, one side wheel hand punch—Bidder 121, \$283; 174, \$745.

Class 301. Eight engine lathes—Bidder 96, \$8560; 143, \$8280; 166, \$9088; 184, \$6480; 232, \$8696.

Class 302. One turret lathe—Bidder 184, \$1139; 189, \$1092.50.

Class 303. Three engine lathes—Bidder 96, \$1545; 143, \$1497; 166, \$1479; 184, \$1050.

Class 304. Two new model engine lathes—Bidder 96, \$1826; 184, \$1530 and \$1680; 189, \$2906.

Class 305. Two toolroom lathes—Bidder 189, \$1244.

Class 306. One turret lathe—Bidder 184, \$428; 189, \$460.

Class 307. One turret lathe—Bidder 184, \$541; 189, \$607.50.

Class 308. Four bench lathes—Bidder 184, \$1738; 189, \$3432.

Class 309. Three bench drills—Bidder 184, \$72.75; 189, \$87.

Class 310. Four drill presses—Bidder 78, \$381; 184, \$391; 189, \$616.

Class 311. Two automatic screw machines—Bidder 30, \$1562; 189, \$810.

Class 313. One plain grinding machine—Bidder 30, \$684; 73, \$650 and \$840; 143, \$675.

Class 314. Four emery wheel grinders—Bidder 16, \$240; 78, \$152; 145, \$357.00; 184, \$168.

Class 315. One plain milling machine—Bidder 19, \$342; 30, \$357; 74, \$332; 87, \$375; 184, \$340.

Class 316. One plain milling machine—Bidder 19, \$844 and \$919; 30, \$963; 96, \$927; 166, \$938; 184, \$875 and \$950.

Class 317. One plain milling machine—Bidder 19, \$1204; 30, \$1985.75; 184, \$1810.

Class 318. One universal milling machine—Bidder 19, \$786; 30, \$742.50; 87, \$691; 96, \$690; 184, \$813.

Class 319. Two universal milling machines—Bidder 19, \$1722 and \$1822; 30, \$1840 and \$2092; 87, \$1786 and \$1986; 96, \$1784; 166, \$1722; 184, \$1768 and \$1868.

Class 320. Two vertical milling machines—Bidder 19, \$1456 and \$1676; 30, \$1676; 87, \$1266.

Class 321. Two shapers, complete—Bidder 73, \$830; 87, \$700 and \$810; 96, \$776; 166, \$730; 184, \$652 and \$882.

Class 322. Two shapers, complete—Bidder, 73, \$1180; 87, \$820 and \$956; 96, \$880; 166, \$990; 184, \$808 and \$1038.

Class 323. One surface grinding machine—Bidder 30, \$375.

Class 324. One universal cutter and reamer grinder—Bidder 30, \$227.50 and \$272.75; 184, \$311.

Class 325. One universal grinder—Bidder 30, \$657; 73, \$598.

Class 326. One universal grinder—Bidder 30, \$838; 73, \$812.

Class 327. Four drill presses—Bidder 166, \$400; 184, \$596.

Class 328. One automatic gear cutter—Bidder 30, \$959; 184, \$655.

Class 330. One vertical chucking machine—Bidder 28, \$978 and \$2327; 73, \$1010; 184, \$980.

Class 331. One vertical boring machine—Bidder 28, \$2537; 166, \$2768 and \$2860; 184, \$2434.

Class 333. One wire feed screw machine—Bidder 30, \$505; 184, \$286 and \$339.

Class 334. One plain screw machine—Bidder 30, \$819 and \$1010; 184, \$684 and \$668.

Class 341. One 10-ton locomotive crane—Bidder 14, \$7050 and \$6425; 22, \$6300 and \$7800; 66, \$6395; 109, \$5900.

The following bids were opened May 24, Circular No. 364, for supplies for the Isthmian Canal Commission:

Bidder 10, Dean Steam Pump Company, New York; 15, Excelsior Equipment Company, Pittsburgh, Pa.; 17, Fairbanks, Morse & Co., Chicago, Ill.; 19, Fox Bros. & Co., New York; 20, Gardner Governor Company, Quincy, Ill.; 31, Lucas Machine Tool Company, Cleveland, Ohio; 34, Manning, Maxwell & Moore, New York; 37, Motley, Green & Co., New York; 43, C. I. Patterson Company, New Orleans, La.; 49, Stauffer, Eschleemann & Co., New Orleans, La.; 62, Epping Carpenter Company, New York.

Class 3. Two boiler feed pumps—Bidder 10, \$877; 15, \$1120; 17, \$1050; 19, \$854; 20, \$1020; 34, \$1065.00; 37, \$991.50; 43, \$1015; 49, \$860; 62, \$1435.

Class 4. Three forcing presses—Bidder 31, \$1140; 34, \$2794.50.

Bids were received by the Isthmian Canal Commission, Circular No. 366, May 28, for supplies as follows:

Bidder 28, Fox Bros. & Co., New York; 60, Motley, Green & Co., New York; 69, Prentiss Tool & Supply Company, New York.

Class 1. One centering machine—Bidder 28, \$94; 60, \$115.

Class 2. One drilling machine—Bidder 69, \$1050.

Class 3. One bar cutter—Bidder 28, \$2475; 60, \$2325.

The following awards have been made for the navy yards, bids for which were opened May 14:

W. H. Wood, Media, Pa., class 442, one hydraulic riveter, \$4700; class 443, one sectional flanging machine, \$4195.

The Chandler & Farquhar Company, Boston, Mass., class 444, one milling machine, \$200.

Manning, Maxwell & Moore, New York, class 445, three high speed drills, \$435.

The Babcock & Wilcox Company, New York, class 446, one watertube boiler, \$2600.

The Fox Machine Company, Grand Rapids, Mich., class 447, one pattern makers' lathe, \$730.

The Crescent Machine Company, Fredonia, Ohio, class 448, one band saw, \$129.

The Drew Machinery Agency, Manchester, N. H., class 449, one buzz planer, \$200.

The Vandyck-Churchill Company, New York, class 451, one cold metal sawing machine, \$975.

The Navy Department will receive bids until August 1 for building five 700-ton, 25-knot torpedo boat destroyers, authorized by the last Congress. Bidders are asked to submit figures for both reciprocating engines and steam turbines.

The circular sent out by the Bureau of Supplies and Ac-

counts, Navy Department, Washington, asking bids on a large quantity of supplies, to be opened June 11, 13 and 18, covers the following machine tools: Fifteen air compressors, one high pressure blower, one sensitive drill, one emery grinder, one engine lathe, one extension gap lathe, one bolt threading and tapping machine, one column shaping machine and one drill press.

Catalogues Wanted.—The Industrial Engineering & Supply Company, S. A., Apartado 1571, Mexico, D. F., Mexico, has been recently organized to handle and sell mine supplies and machinery and electrical equipment in the Republic of Mexico. Hardware of a general character used by mines and railroads will also receive attention. Since both duties and freights on shipments to Mexico are based upon weights, it is highly important that the purchaser should know the weight of each shipment, in order to intelligently estimate the cost of goods delivered. It is, therefore, suggested that in making quotations on machinery shipments the weight of each package should be stated. The company invites manufacturers to send catalogues relating to the lines named, and, if possible, note therein weights of the various articles listed. The officers of the company are: W. W. Wheatly, president; James A. Pierce, general manager; Wm. C. Benbow, general sales agent.

The Hutchinson Iron Works, successor to the Hutchinson Machine & Foundry Company, Hutchinson, Minn., manufacturer of gasoline engines, bob sleighs, &c., and general machine and foundry work, desires catalogues from makers of springs.

Gantry Crane at the Fore River Shipyard.

For handling heavy weights in fitting out vessels, says the *Engineering Record*, there has been installed on the outfitting dock of the Fore River Shipbuilding Company, Quincy, Mass., a 75-ton gantry crane with folding jib. The crane travels 1000 ft. along the dock, and has an outreach of 93 ft. Each end of the gantry is carried upon two four wheel trucks of very heavy construction, which run on tracks of 4 ft. gauge, spaced 54 ft. between centers, the outer track resting upon the concrete dock wall. There are two hoisting trolleys traveling on 5-ft. plate girder runways located 49 ft. above the dock. These have respective capacities of 50 and 25 tons, and are arranged to pass each other, the larger traveling on the upper edge of the girders, while the smaller one operates on the lower edges. For very heavy weights, an equalizing beam is provided, by means of which the two trolleys, working together, can lift up to a maximum of 75 tons.

The overhanging portions of the plate girder runways are hinged at the gantry frame, and are provided with hoisting gear for lifting, in order to permit passing vessels with masts. At the end of the overhanging jib is placed a 10-ton hoisting tackle for auxiliary lifting purposes. The crane has in all seven motions, including the traverse motion and the hoist of each of the large trolleys, the raising of the overhanging boom, the auxiliary tackle at its outer end, and the travel of the gantry along the dock. For this last, the gearing is adjusted for two speeds, 57 ft. and 165 ft. per minute.

The Steel Passenger Car.—Steel passenger cars, which the Pennsylvania Railroad is substituting for wooden ones, in order to provide noncollapsible and thoroughly fireproof cars for the Hudson River tunnel, have been given extensive tests. The experimental car can, it is stated, face any load or collision to which it might be subjected. It weighs 103,550 lb., as against 84,500 lb. in the standard car which it is to displace, an increase of 22½ per cent; but it is found that the added weight very greatly reduces the vibration, and thus adds to the comfort of the passengers. The frame, which is hidden, is similar in form to a cantilever bridge, being suspended upon the trucks as pliers, and is said to provide absolute safety against telescoping. The steel sleeping cars, which the Pullman Company is building for similar service, weigh 25 per cent. more than the present sleeping car.

Recent estimates of the gold production of the world in 1906, based on nearly complete statistics, put the total at \$405,000,000, an increase of nearly \$30,000,000 over 1905. In Africa alone the increase was \$21,000,000. The United States, with a total of \$96,000,000, made an increase of \$8,000,000. For 1907 a further gain is predicted.

The Expansion of the Aluminum Industry.

In reviewing the development of the aluminum industry during 1906, the London *Engineer* notes that the past year was marked by the expiration of five of the United States patents granted to Hall in 1889 for the production of aluminum. The Héroult patents lapsed in Europe in 1902, and the manufacture of aluminum by the electrolytic method is now free, and may be commenced in Europe by independent companies without payment of any royalties to the original patentees.

In America the use of the electric current for the maintenance of the electrolytic baths in a state of fusion is covered by the Bradley electric furnace patents, which do not expire until 1909, and in the United States, therefore, the manufacture of aluminum is still a monopoly of the Pittsburgh Reduction Company, now the Aluminum Company of America.

The following is a list of the companies and works producing aluminum at the present date, with the power controlled by each works:

British Aluminum Company.		Horsepower.
Foyers, N. B.	.....	5,000
Sarpfos, Norway	.....	10,000
Extensions and new works in progress: Loch Leven, N. B.;		
Conway Valley, N. Wales, and Osleres in Switzerland;		
combined schemes equal to		60,000
<i>Société Electrometallurgique Française.</i>		
La Praz, France	.....	7,500
Gardannes, France	.....	7,500
<i>Compagnie des Produits Chimique d'Alais.</i>		
Calypso, France	.....	10,000
St. Felix, France	.....	2,500
<i>Aluminum Industrie Aktiengesellschaft.</i>		
Neuhausen, Switzerland	.....	5,000
Rheinfelden, Germany	.....	5,000
Lend Gasteln, Austria	.....	15,000
Extensions and new works in progress: On the Rhone and		
Navigence in Switzerland; combined schemes equal		
50,000 hp. to		75,000
<i>Aluminum Company of America.</i>		
Niagara Falls (two works)	.....	10,000
Shawinigan Falls, Canada	.....	5,000
Massena, U. S. A.	.....	12,000
<i>One Italian Company.</i>		
Pescara, N. Italy	.....	3,000

The aggregate power controlled by these six companies and 14 works is 97,500 hp. Assuming that 4-hp. years are required to produce 1 ton of aluminum, this total power would suffice to produce 24,000 tons of the metal per annum. This output has, however, never yet been attained.

In the first place, the reduction plant in many of the works is not equal in capacity to the generating plant, for, until the sudden expansion in the use of the metal last year, the demand for aluminum did not warrant such an increase in producing power. In the second place, the maximum power development of the water power controlled by the aluminum companies is only attained during the winter and spring months of the year, and for a period extending from one-third to one-half of the year the output of electrical energy is far below that indicated by the above figures. These two causes have tended greatly to reduce the output of aluminum by the various producing companies in the past, and it is estimated that the production in 1906, with the great incentives of keen demand for the metal and increased price, was only about 12,000 tons, or one-half of the maximum possible, given above.

The demand for the metal during 1906 has, therefore, been largely in excess of the output, and the reduction plants are now being extended rapidly in many of the works, in order to obtain the benefit of the high prices ruling for aluminum sheets, rods and bars.

The following table gives the figures for production and price per ton of 2240 lb. for the period 1896-1906:

Year.	Production.	Price per ton.	Year.	Production.	Price per ton.
1896	1,755	£155	1902	7,750	£120
1897	3,327		1903	8,102	
1898	3,953		1904	8,550	
1899	5,459		1905	9,000	
1900	7,192	148	1906	12,000	200
1901	7,420		....	....	...

Since the year 1902 the producing companies have declined to publish any official figures, and the outputs are estimated. The prices given are those quoted by the British Aluminum Company for 98 to 99 per cent. ingot metal.

As regards the more important extensions, the British Aluminum Company is carrying out a large scheme of water power development on Loch Leven, in Scotland, which will add enormously to its power resources in this district. The scheme involves the construction of a reservoir $7\frac{1}{2}$ miles in length at an elevation of 1000 ft. above sea level. When completed, this reservoir will have a storage capacity of approximately 20,000,000,000 gal. and will form one of the largest artificial lakes in Europe. The Aluminum Industrie Aktiengesellschaft, which already controls 25,000 hp. in the three works at Neuhausen, Rheinfelden and Lend Gasteln, is also carrying out two very large schemes of water power development in Switzerland, by which from 50,000 to 75,000 hp. will be obtained from the waters of the Navigence and the Rhône. The former company expects to have one portion of its new scheme of water power development completed during the present year. The latter company likewise hopes to have some units of its new plant working before the end of 1907.

Labor Notes.

Employees of the Pope Mfg. Company at its shops at Westfield, Mass., have gone on strike for an unusual reason. They claimed that a man employed in making a parts catalogue was acting as a spy among them. His task necessitated his being in various parts of the works, which led to an unfounded suspicion.

A portion of the pattern makers, numbering 24 men, employed by the General Electric Company at its works at Pittsfield, Mass., have gone on strike because of the refusal of the company to grant an increase in wages. The men asked an advance from 39 to 43 cents an hour and declined to accept a compromise of 41 cents.

The organized molders in Youngstown, Ohio, will ask for an increase in wages at the expiration of the present scale on July 1. The present scale is \$3.20 a day, while the Pittsburgh rate is \$3.50 a day, and it is expected that the men will ask for a minimum rate of \$3.35 or \$3.40 per day.

On Monday, June 10, committees representing the Amalgamated Association and Republic Iron & Steel Company will hold a conference in the offices of the latter in the Frick Building Annex, Pittsburgh, for the purpose of taking up the new scales for puddling and finishing mills.

It is probable that a meeting of committees representing the Amalgamated Association and the American Sheet & Tin Plate Company will meet about June 18 in Pittsburgh to take up the sheet and tin plate scales. Advances are asked by the Amalgamated Association in these scales, and the result of the conference is awaited with a good deal of interest.

The strike of the machinists of Cleveland, Ohio, was inaugurated June 3, and according to the claims of the machinists, which are probably somewhat overestimated, there are 1800 men out, 1200 of whom are union men and 600 are nonunion men. The strikers claim that in 29 shops their demands were granted on the first day, but the concessions were apparently granted only in some of the smaller shops employing very few machinists. The employers claim that only one concern of any importance has yielded to the strikers. About 40 large manufacturing establishments are affected by the strike. These include a number of manufacturers of automobiles and automobile parts. The machinists demand a 9-hr. day and a 10 per cent. advance in wages, which would make their pay under the shorter hours about the same as it has been. About 60 brass workers employed by automobile shops also struck for a 9-hr. day.

The Norton Grinding Company Apprentice Association.

The Norton Grinding Company, Worcester, Mass., in its efforts to make its apprentice course as attractive as possible to young men, has fostered the organization of the Norton Apprentice Association. Charles H. Norton, for whom the company is named, has devised the plan, and has used his best efforts to stimulate interest among his boys, with pronounced success. The purpose of the association is industrial betterment, and not social betterment or welfare work. The idea is that the greater the interest of the boys and the more desirable the apprentice course, regarded from the standpoint of young men, the better it will be for them as well as for their employers, and the more desirable boys will be attracted to the course. While it may be presumed that a certain percentage of apprentices will go elsewhere to work at the end of their contracts, yet the company has the services of all during three years, and a majority of them will remain after they become journeymen. The difficulty of obtaining the right sort of boys was one hard to overcome in Worcester, but the company has now built up a goodly body of apprentices which will probably number from 40 to 50 before another year has passed. This element in the labor of the large shop has proved itself very valuable, and the effort to enlarge it is considered well worth while. The boys do good work; in fact, the company's experience is that they do much of the work that is given them as well as men could do it, and if the boys were not there men would have to be employed in their places. Experience has shown that the apprentices pay well as workmen of the present, and in addition there is the all important consideration of the future. Consequently, the advantages given them, though in certain ways costing some money, are believed to constitute an excellent investment.

The Apprentice Association has its own letter head, containing an appropriate symbol, consisting of a grinding wheel at work against a shaft. It has its officers, consisting of president, vice-president, secretary and treasurer. There was a contest for the presidency, in which there was no interference on the part of the company's representatives. A visiting committee has been appointed by the boys to look after those members who are absent on account of illness. The apprentices are given one hour a week of shop time for their meetings, and a suitable room is set aside for the purpose. They invite speakers to address them, and have listened to a number of interesting talks. It is planned to have a button containing the association symbol. Graduate apprentices will be honorary members.

The Norton Grinding Company is employing other methods of making its apprentice course attractive. One is the encouragement of the boys to learn the elements of mechanical drawing and machine design by a course in Y. M. C. A. classes. The company pays the tuition of \$5 a year and supplies each apprentice with a set of drafting implements, which remain the property of the company, to be used afterward by other boys. The young men have attended the classes two evenings a week. It is not presumed that a boy will become a well trained draftsman in the three years of his course, and instruction in the reading of shop drawings will be continued in connection with the routine of the course. But the apprentice will get a good general idea of the subject. They have enjoyed the work, as well as feeling a natural gratification that their employers should take so much interest in their advancement.

The Firth-Sterling Steel Company, Pittsburgh, works at Denmler, Pa., is adding a second story to its warehouse, which will be used for office purposes. At present the offices are separated from the plant by the Baltimore & Ohio Railroad, and to overcome this inconvenience it has been decided to locate the offices above the warehouse.

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HARDWARE

THE coming meeting of the American Hardware Manufacturers' Association and the Southern Hardware Jobbers' Association is the important trade event of next week. These organizations are respectively the youngest and the oldest of the great associations of the trade, the Southern Jobbers' having the distinction of priority among the jobbing organizations of the country, while the vigorous and influential organization of the manufacturers is of comparatively recent origin. The place of meeting adds not a little of interest to the gathering. Richmond, besides being a point of growing commercial and industrial importance, is an exceedingly attractive capital, and holds a unique position as the scene of stirring events and the storm center of a conflict, from the recollection of which all bitterness is obliterated, while there remains the memory of heroism and loyalty, however manifested, which is now the common heritage of a happily prosperous and united land. In this spirit the monuments will be looked upon and the battlefields visited by the delegates from North and South alike, the former antagonism serving to give warmer expression to the fraternity and good feeling by which all parts of the country are now bound together. The arrangements for the conventions have been carefully completed in such a way that with the attention to grave business matters there will be abundant opportunity for recreation and pleasure, thus contributing largely and very properly to the usefulness of the gathering.

In reviewing the list of goods comprising present day stocks of Hardware one cannot fail to be impressed with the expansive tendencies of the line. In perhaps none other of the several mercantile divisions is more constant study and application necessary to keep abreast of change and advancement than is required in the Hardware trade. The merchant who lacks alertness, who fails to keep posted on the new and improved appliances constantly coming into the market, or who fails to note and grasp opportunities offered to divert unattached lines into his own channels, will scarcely meet with any great measure of success in the Hardware business. So rapidly do changes come that one out of touch with trade events for even a few months finds himself seriously handicapped upon re-entering the field. Only a few years ago the handling of Electrical Goods and Supplies in Hardware stores was not thought of, but to-day house electrical equipment appliances are a recognized part of such stocks. Bicycles and Bicycle Supplies, after many vicissitudes, finally found permanent lodgment in the Hardware store; nor are these the only instances that might be cited of the trade's tendency to embrace new lines. Reference has been made before in these columns to indications that strongly point toward a like adoption of Automobile Supplies. Marked advances have, indeed, already been made in this direction, and many stores are now profitably handling such goods. Motorists doubtless will soon be able to find fairly complete lines of needed supplies conveniently at hand in Hardware stores.

Condition of Trade.

With the entrance of June the influence of the coming summer is beginning to be felt, and this will account for a somewhat more moderate activity in the larger deal-

ings of the trade. Manufacturers generally are fully occupied on orders, and many of them have on their books enough to keep them going for at least a month or two. Generally speaking, however, goods are easier to obtain and shipments more promptly made. There is less complaint than heretofore about delays in transportation, a condition which results in part at least from the increased efficiency of the railroad service, stimulated possibly by the complaints of jobbers and consignees. There is in Hardware and its allied lines, as in other branches of business, evidence of a conservative spirit, in view of the uncertainties of the crops. With a general impression that the reports of injury to grain are exaggerated, there is the recognition of the fact that something has already been lost in fruits and minor products, and that something of a shortage in the harvest, as compared with the yield of recent years, has to be reckoned with. How far good prices will make up for this remains to be seen, but while business men are inclined to curtail enterprise and to buy less liberally than has become a habit, there is a hopeful feeling that prosperity will continue and that business will not greatly suffer. Something in the way of a slackening in the pace is doubtless desirable, as prices are getting too high to be permanently maintained. A moderate reaction in values, of which as yet there seems to be but little indication so far as the immediate future is concerned, might be a good thing in the long run, as preparing for a continued well-being of the people and a sustained and normal activity in trade. If the summer months should pass without any serious reaction it will, of course, be a matter for congratulation, while if there should come a serious falling off in demand and curtailment of enterprise and expenditure, with resulting concessions in prices, there will be the consolation that the country is in excellent condition to meet such a state of things and that a little quiet, even with the development of somewhat lower prices, will have unquestioned advantages. Meanwhile trade moves along in excellent volume, and manufacturers and merchants, wholesale and retail, are fully occupied with current business.

Chicago.

It is gratifying to note that, notwithstanding the effect of bearish influences that might reasonably have been expected to operate adversely against it, Hardware trade for the month of May has largely exceeded that of the same month a year ago. Possibly the volume of business done has fallen a little short of that recorded for the previous month, but at that it has exceeded the expectations of dealers. With the coming of summer months a gradual falling off is naturally expected and a quieter movement beginning with this month is looked for. Still precedents have been set at naught so many times during these days of flush prosperity that predictions of the most probable nature seem hazardous. The growing practice, however, of placing contracts for forward deliveries makes it necessary for Hardware merchants, especially the jobber, to anticipate requirements far into the future. The large distributors are therefore compelled to scrutinize conditions with the utmost care to guard against missteps. Under the circumstances it is significant that the large jobbing interests are reported as buying freely for future delivery. An instance is noted of an exceptionally large order taken by a manufacturer for a line of goods to be delivered six months hence, which makes them available for the early spring trade of next year. Such transactions reflect the opinion of the buyer as to the probable demand for that period. Locally, the trade

has felt the effects of continued cold unseasonable weather which clings to the lake region with great tenacity. In Heavy Hardware the strength of demand is unabated. Deliveries of Steel Bars are still slow, being from two to four months delayed. On the whole, however, complaint of both car shortage and belated shipments is less general.

St. Louis.

NORVELL-SHAIPLEIGH HARDWARE COMPANY.—More cold rains. It is enough to give the most sanguine a case of the blues. Nevertheless, the record for May business shows a very handsome increase over last year. Fortunately, this city reaches out into a wide territory, and probably the sun is shining somewhere.

St. Louis has an Aero Club, and we are claiming honors as the balloon center of the United States. Aero-nauts who have made recent ascensions inform us that if we wish sunshine it is only necessary to reach an altitude of 10,000 ft. above the earth. There, they state, the sun shines brightly and all the clouds and storms are under them. We have all joined the Aero Club, and instead of waiting until the clouds roll by, we propose to go straight up and hunt the sunshine.

Notwithstanding the rains of the past week, our city has had the honor of entertaining the National Millers' Federation, Secretary of War Taft and W. W. Finley, president of the Southern Railway Company.

Secretary Taft had a strenuous day. He was entertained by the Commercial Club at luncheon. He spoke to a mass meeting of the millers at 2.30. At 4.30 he met the ladies at the Glen Echo Country Club. From 5 to 6 he was the guest of the University Club. At 8 o'clock he took a seat at the millers' banquet, from whence he departed at 2 a. m.

Surely these are strenuous days, and it takes a strenuous breed of men to keep up with the procession. While the President's right-hand man was leading this strenuous life in St. Louis, the President at the same time was making new records in Indiana and Michigan.

A friend writes from Monte Carlo: "You should be over here automobiling. The roads are fine, and there are only two speed limits—the capacity of your car and the nerve of the chauffeur." No, thank you, things are coming fast enough over here—it is enough to make one's head swim just to read the daily papers.

To inquiring friends we beg to say we had nothing to do with the Texas law in regard to the sale of Revolvers. At the time we wrote on this subject, three weeks ago, we had not heard of the new Texas law. The State of Texas has been a fine field for the sale of Revolvers. This trade will now be turned over to the catalogue houses. It will be great picking for them. How absurd to pass such a law, tying the hands of the local merchant when the goods can be supplied to the consumer through the mails from a faraway State under the protection of the Interstate Commerce law!

Cleveland.

THE W. BINGHAM COMPANY.—In spite of the cold rainy weather we have had in the last few weeks trade has kept up remarkably well, and a little warm, clear weather will bring large orders for spring and summer goods. A great many people now seem to be interested in the prospect of the coming wheat crop. While it may fall a little below the crop of a year ago, there is still reason to hope for a big crop of wheat. Good crops make prosperous times and a good volume of business.

Trade in general seems to be excellent on all lines of goods. A large amount of Nails and Wire is going forward just now; in fact, the mills are not filling and shipping orders as fast as we or our customers desire; still they are reasonably prompt. Customers would do well to order Nails and Wire in less than car lots from jobbers, as these goods can be shipped more promptly from their stocks and the price is only a little higher than the price from mill. Galvanized and Black Sheets and Merchant Pipe are wanted quick nowadays, and customers had better order this material also from jobbers' stocks rather than wait for mill shipment.

Lawn Mowers, Refrigerators, Ice Cream Freezers,

Wire Cloth, Poultry Netting and other kindred goods are in good demand, and many customers who ordered early find their stocks broken and are reordering. Those who did not order early are now anxious to get an assortment. Most all jobbers are well supplied and can furnish these goods quite promptly.

Trade conditions are about the same as they have been since the first of the year, with perhaps a little more demand for season goods which are used at the present time.

Portland, Oregon.

FAILING, HAINES & MCCALMAN.—As in our last letter we are still expecting even better times than we have at present. The increase in general business continues without a check, and Portland is leading the United States in the increase of bank clearings. As we said before, this is not due to speculative operations in real estate, but to the genuine business of the community. The unfavorable crop conditions, which, according to the newspapers, have been threatening the Middle West, have no counterpart in this section, as all country tributary to Portland is looking for abundant crops in all lines. This, of course, means a continuance of prosperity for another year.

The demand for Heavy Hardware continues unabated. If anything, it is greater now than it has ever been. Jobbing houses have orders for six months' delivery, which they do not know what to do with. National prosperity has, of course, a great deal to do with this. Oregon has never had such a wave of prosperity as at present prevails here. Steelmen report greater demands than ever. Railroad building, machine shop activity and a thousand and one other things which go to make business conspire to keep Hardwaremen busy. The unprecedented influx of settlers keeps the retail Hardwaremen and Implement houses wishing for more goods with which to supply the extraordinary demand. Oregon has gained several thousand new families in the past few months. The effect of this immigration, of course, is very beneficial.

Building construction in Portland is of such magnitude that this city has led the country in increase. For instance, April, 1907, leads April, 1906, with a percentage of over 200. March, 1907, shows a gain of 56 per cent. over the corresponding month of last year. Construction authorities and statistics agree that Portland's increases are greater than any other city in the United States. Money is in evidence everywhere, but goods are scarce. Eastern factories cannot supply the Coast trade fast enough. Portland houses have refused a lot of orders because of not being able to fill them. While an effort is being made to supply the regular trade new customers are subjected to long delays in receiving goods.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Wholesale trade for the month of April was quite satisfactory and exceeded the previous year, thus indicating the demand for goods. The weather for the month of May, however, was more unseasonable and winterlike than any May heretofore for a number of years. This is according to the general Government report, and the condition has prevailed in our local districts also. This no doubt has had its effect upon the general volume of trade, which, however, was very fair. We had prepared ourselves in ordering stock and were, therefore, able to supply the retail trade's requirements practically on receipt of orders. Nearby manufacturers report good sized orders, and some are still behind on their orders. They also report that export trade continues good.

Crop conditions have caused considerable anxiety with customers, although notwithstanding this they are not greatly discouraged, largely owing to the fact that crops for the last two years have exceeded anything before known. Owing to crop conditions throughout the country it is expected there will be an advance in prices, although a surplus was carried over last year on several kinds of agricultural products.

The trade generally wonder why, owing to the prosperity of the country, collections are not equal to former years, but they must take into consideration there was

an advance in prices of goods and also an increase of trade with the retail merchants, and if their capital had not increased they naturally found difficulty in making the quick remittances which are usually expected of them. We hear of no complaints from our customers of the present level of prices, all knowing that the advances in salaries and raw materials have caused these advances, so the complaint we heard one year ago has subsided. We anticipate a good trade for the balance of the year.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—We have been writing you encouraging reports for such a great length of time that we almost do so from force of habit, but in looking over the crop reports that we now have before us, we cannot see anything to justify us in sending you an encouraging report at this time. Cool spring weather has prevailed over almost the entire South up to the present time, and the unusual amount of rain has retarded all farm work and has caused the ground to be more productive of weeds, grass, cut worms, army worms, boll worms, &c., than it has of corn, wheat, vegetables, fruit, &c. The early vegetable and berry crop was practically destroyed; the later crop is never so profitable. The fruit crop in nearly all the Southern States has been very badly damaged, and in some sections totally destroyed. The cool weather and continued rain has injured the corn crop very materially, besides making it quite late. In many cases corn has had to be plowed up and replanted, in some instances the second time.

Possibly the most serious injury that has been done by the continued cool rainy weather is to the cotton crop. A great deal of cotton has had to be plowed up and replanted. The enormous price paid for seed will reduce the profit on the crop, even if the weather permits the crop to be made at all. The scarcity of seed will reduce the acreage, as some people were absolutely unable to procure seed to replant.

While we do not see anything encouraging in the present prospects for the crop and for future business in the South, we only hope that conditions will improve as the season advances. If we could have favorable weather from this time forward, we think that a pretty fair crop would be made.

The retail merchants in most sections of our country have a bad case of the "blues," but some pleasant sunshine and favorable weather for a short time would cause a wonderful improvement in the situation; but so far we unfortunately have no guarantee from the weather man that conditions will change. The crop conditions and unfavorable weather have had a depressing effect on business already. Collections are very good for this time of the year.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—The conditions of trade in May have been somewhat unusual, owing to an abnormally low temperature having prevailed during the month, this difference averaging 5 to 6 degrees and making a reduced demand for summer goods among the dry goods and furnishing houses. The effect on the Hardware business, of course, was much less felt, and in this line there has probably been about the amount of trade that was expected. During the past week the weather has improved and crops generally are now growing nicely. The conditions may be considered favorable, and merchants are feeling well.

Probably there has been a little less than the usual amount of small grain sown, but the shrinkage of acreage is not large and the ground has been in fine condition for seeding. Grain and grass are now growing satisfactorily, though, perhaps, a week or so late. There has been a pronounced tendency toward north winds and colder weather after rains, but now that summer days are here, this feature will probably pass away.

Prices have remained firm and business is running along satisfactorily. Merchants are buying readily for wants. Collections are fair. There is great difficulty in getting some lines of goods, but on the whole manufacturers are able to supply their customers with reasonable promptness and railroads are giving better service.

Boston.

BIGELOW & DOWSE COMPANY.—Notwithstanding the intensely disagreeable weather which continued throughout the month of May, the Hardware dealers of New England have increased their sales over those of last year. An average temperature of 50 degrees, with northerly and easterly winds every day, with a goodly amount of moisture and some frost in the northern section, has not been much to the liking of the market gardeners. Although our season is very late, when the sun and heat does come we will soon forget the past and farmers will reap their harvests just the same. One notes a large number of houses closed for the summer and pities the former occupants, who are freezing at the seashore. June starts in with a cold rain for the past two days, but probabilities promise summer weather near at hand.

Congestion of freight at the stations and in the yards of the city causes annoying delays in deliveries. Factories are still way behind in filling orders and complain that they cannot get deliveries of the raw material on their contracts. Three weeks from Pittsburgh to Boston on carloads of freight is too long where the haul is only 600 miles. We all hope the agitation commenced at the late convention in Richmond will result in better service on our railroads.

Stocks of general Hardware are in fair shape, but this market at times has been nearly bare of Wire Fencing and Wire Nails. Lawn Mowers are in good demand and stocks are broken. The lawns are green and the grass grows rapidly. Last year was the banner year for Lawn Mowers and the outlook is for another large sale.

Market prices are firm, with still many advances. Good weather for June and July will round up a very satisfactory business for the first half, and there is nothing in sight to prevent present conditions continuing through the year.

New Orleans.

WOODWARD, WIGHT & Co.—The last two weeks in the Hardware business have been going on very smoothly, with a steady but not phenomenal business like that of last year. The prospects in regard to cotton are still uncertain, and the probability is that the crop will leave considerable money in the South even if it is a small one, as the price shows a tendency to make up for any possible shortage. The sugar interests are in very good shape, and the lumber people are rapidly getting cars.

The financial situation here is looking up, and money seems to be loosening. Collections are coming in better. Deliveries are getting a little better.

There is a movement here now to start a World's Fair in New Orleans at the completion of the Panama Canal, which is estimated to be about 1915. Financial committees have been appointed, and it is quite possible we may get things in shape, so that we can make calculations for this event. Certainly any improvement in river navigation and the commencement of active operations, even of the Tehauntepec Railroad through lower Mexico, will, either of them, tend to the immense benefit of this city. The American Sugar Refinery has located here what is probably the largest refinery in the world, and it will probably be completed inside of the next six months. The locating of it here is based on the availability of this port for both Hawaiian and Cuban sugars.

All in all, there is considerable improvement in the situation over that of the last 60 days.

Baltimore.

CARLIN & FULTON.—Notwithstanding the most wonderful weather conditions which have ever been recorded by the Weather Bureau, it is remarkable that the volume of trade in the Hardware business has kept up so well, showing conclusively that there has been no accumulation of stocks in the hands of the retail dealers. Had the weather for the last month or two been more seasonable there is no doubt that sales generally would have greatly excelled the record of a year ago.

While the Hardware trade has had probably less to complain of than any other, the general storekeepers throughout the country and retail dealers carrying mixed

stocks of goods have suffered severely from their inability to move lines of goods, especially dry goods, notions, boots and shoes, and such articles as depend greatly upon the temperature for the demand. The farmers, too, have had great reason to complain on account of the backwardness of their crops, and the injury to the early fruits and vegetables, which always put large amounts of money in circulation when they have the advantage of early markets. We believe, however, that the damage to the great staple crops of wheat and cotton is overestimated, while as to corn it has hardly been planted, and cannot be injured, merely delayed in growth.

Speculation rather than actual injury to the growing crop has given an inflated value to wheat, though for the sake of the farmer we would be glad to see him receive the benefit of the price which unfortunately rules when the grower has but little to sell; and of course no one believes that the price will be of long duration. This country is too great in area to have a complete failure of any crop which it raises, and while in some sections there may be a lessened production, in some other sections the crop may be normal or extraordinarily large.

Important as are our manufacturing and mining interests, our business prosperity undoubtedly rests mainly upon agriculture, and with the great diversity of the crops there can be no general disaster to them which would involve all.

According to all trade reports, the Iron and Steel industries show no let up, and an active business is assured in at least raw material for many months to come. If we can only have between capital and labor fair dealing and conservatism and honesty of action, there is no reason to look for any change in the prosperity which has blessed this country for the last few years.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—Despite the perturbations of Wall Street the Iron, Steel and Hardware markets are firm, and apparently in a healthy condition. A canvass of the sources of supply for the coming season's wants persuades us that the cost of manufacturing material has increased, and that raw material is exceptionally strong. There may not be so much new business coming into market, but there is enough to keep the factories well filled up on top of old orders which have been delayed these many months and to enable them to get their order books into better shape and make very necessary repairs.

Of course, the crops are not yet determined, which are all important factors, but wheat in this section is good, and corn, though somewhat late, is doing well wherever planted. The high prices of the last year or two have left a deal of money in the country banks, so that even if this year's product were not so record breaking as we have become accustomed to, nevertheless there will be enough to go around, and the high prices on cotton, grain and all farm products seem bound to make up for any ordinary deficiencies.

Railroad earnings continue good, and the proposed increase in freight rates will probably compensate for the increased operating expenses. A great system like the Burlington would hardly make a 10 per cent. advance to all employees unless conditions justified it. The city banks are making special preparations for fall demands, even before we have fairly shed our overcoats in the spring. We have never seen them imbued with the desire to be quite so forehanded as this year.

It is to be hoped that some improvement may be made in the currency which will prevent the annual squeezes and distress to which we are subjected at certain periods. We know that rubber is getting scarce, but there must be some element of elasticity which can be employed to take its place in the business operations of a great country like ours.

Outside of other spheres than those of business encouraging signs are to be seen. The lawlessness of San Francisco is to be checked by a citizens' committee of prominent men, untainted with previous political entanglements. Here in Kentucky the Court of Appeals has handed down a weighty decision in the election cases, the contest of which has been in the courts for almost two

years. The decision was sweeping, and came with no uncertain sound from the highest court of our State. The election here is announced to be invalid, and a conspiracy clearly proven. The Governor will have in his appointment a long list of municipal and county offices, which appointees will hold at least until the next election in November. It is a triumph for law and order.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—The month of May closes with trade conditions in the trans-Missouri region fully as favorable as could be expected. A season of continuous rough and cool weather has retarded farm work of all kinds, particularly corn planting, and everything in this way is in a very backward condition. Owing to the effect of the constantly cool temperature small grains do not show up to advantage as in former seasons, and the growth of these cereals is very much retarded.

In this section corn is the principal staple, and a great deal will depend upon the size and value of the coming season's crop, but it is entirely too early yet to form any kind of an opinion on this important feature. With the advent of warm and genial weather an altogether different aspect would surround the situation. It will undoubtedly come all right, but is very slow and tardy this season.

The whole Western country is in good condition financially, and outside of the annual uncertainty as to the extent of the coming crops there are no developments in sight calculated to disturb the satisfactory volume of business now being enjoyed by every one.

NOTES ON PRICES.

Wire Nails.—The volume of new business is decreasing as the season advances, and spring demand is drawing to a close. Specifications on contract orders continue to be freely received by the mills, but notwithstanding this, they are slowly catching up on deliveries. They are, however, from three to eight weeks behind on shipments. The supply of cars and Steel is better than for some time. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

New York.—Nails are being received from mill by jobbers more regularly and stocks are consequently becoming better assorted. It is thought that most of the Nails bought at lower than present prices have been received in this city and with the freight advance that the local market will take on a firmer tone. New York jobbers' quotations are: To retailers, carloads, on dock, \$2.19; less than carloads, on dock, \$2.33; small lots at store, \$2.30.

Chicago.—While no marked change has taken place, it may be said that some little check in the development of new business is noticeable. Deliveries in Western territory are reported to be not materially better than heretofore. Quotations are as follows: \$2.18 in car lots to jobbers and \$2.23 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—Specifications on contracts continue to come in freely, and shipments by the mills are heavy. The supply of Steel, and also of cars, is better than for some time, and the mills are catching up on deliveries. Some mills are able to ship out in three to four weeks after receipt of order, while other mills are two months or more back on deliveries. The spring demand is pretty well over, but the new volume of business is fairly large. Prices are unchanged, but the market is very strong. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

Cut Nails.—At a meeting of the Cut Nail Association held last week existing prices were reaffirmed. New business received by the mills is largely represented by orders for small lots, but specifications on contract orders con-

tinue to come in freely. Mills are fairly well caught up on back orders, and are making shipments on new orders with considerable promptness. A concession as large as 5 cents per keg is sometimes made from regular quotations by mills desiring business, while those that are still supplied with orders are maintaining regular quotations. Quotations are as follows, f.o.b. Pittsburgh: Carload lots; to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads to retailers, \$2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—Deliveries from mill are being received much more promptly after orders are placed than for some time. Jobbers' quotations have been subject to some irregularity, owing to Nails having been purchased at less than regular mill quotations. With the advance which has taken place in freight rates it is anticipated that this market will become firmer. New York jobbers' quotations are on the basis of \$2.30 for small lots at store.

Chicago.—The demand is represented as being fairly active, though it is evident that new business is coming forward more tardily. Less complaint is heard of delayed shipments due to prompter mill and car service. Quotations are as follows: Iron Cut Nails, car lots, to jobbers, \$2.33; to retailers, \$2.38; Steel, to jobbers, in car lots, \$2.23; to retailers, \$2.28.

Pittsburgh.—New business has fallen off very perceptibly, orders being entered at this time by the mills being mostly for small lots. Specifications against contracts continue to come in freely, but owing to a more liberal supply of Steel and of cars the mills are pretty well caught up on back orders. Mills that are actively seeking new business sometimes name a concession of 5 cents a keg, while other mills that are pretty well filled up are adhering to regular prices. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—Mills are still busy making shipments on contract orders, which are large in volume. Weather unfavorable for field work has enabled farmers to devote more time to building fences, and the season of Barb Wire consumption has been extended for an unusual length of time. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots.....	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Chicago.—Whatever headway, if any, has been made in disposing of accumulated orders is not apparent in Western deliveries. In spite of the heavy shipments being made there are many consumers impatiently awaiting deferred shipments. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.30; Galvanized, \$2.60; to retailers, car lots, Painted, \$2.35; Galvanized, \$2.65; retailers, less than car lots, Painted, \$2.45; Galvanized, \$2.75; Staples, Bright, in car lots, \$2.25; Galvanized, \$2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Owing to the inclement weather of the past month, farmers have prosecuted the building of fences longer than usual, and for this reason consumption of Barb Wire has continued later in the season than usual. Shipments by the mills are fairly heavy, specifications against contracts still being received in large volume. The market is strong, with no change in prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots.....	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Smooth Fence Wire.—Mills are slowly catching up on contract orders, specification shipments of which are heavy. The consumption of Wire for fence building has continued longer than usual, owing to the unfavorable

weather for farm work. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.85
Retailers, carloads.....	1.90

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—A little improvement in deliveries is noticeable, though there is yet room for future betterment. Since the season is now so far advanced a quieter movement will doubtless soon be seen. Quotations are as follows: In car lots, to jobbers, \$2, f.o.b. Chicago, and to retailers, \$2.05.

Pittsburgh.—The cold wet weather this spring has made it practically impossible for farmers to work in the ground, and they have been building fences, so that consumption of Smooth Fence Wire has continued longer than usual, and explains the large demand still existing for Fence Wire. The mills are gradually catching up on contracts, on which buyers are specifying freely, and shipments by the mills are heavy. We quote, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.85
Retailers, carloads.....	1.90

Sheet Metal Products.—In a general way it may be stated that the market for Black and Galvanized Sheets continues exceptionally firm, with important manufacturers still far behind their orders. As a result, prices on Sheet Metal products are steady in spite of a slight reduction in the volume of new business. Something is heard, however, of concessions on Conductor Pipe, &c., especially in the West, but business on this line is naturally quiet at this time of year and important bookings are not expected before July and August. The quarterly meeting of the Associated Manufacturers is in session as we go to press, but the opinion is expressed that no important changes are likely to be made.

Bolts, Carriage and Machine.—An advance in the smaller sizes of Carriage and Machine Bolts was announced last week by leading manufacturers, the change amounting in the case of Carriage Bolts to 7½ per cent., and in the case of Machine Bolts, 5 per cent. The regularly announced discounts on these lines are as follows: Carriage Bolts, 70 and 5 per cent.; Machine Bolts, 70 and 7½ per cent. In explaining the advance, manufacturers state that it is due to the high price of material and the difficulty in securing adequate supplies for the operation of their machines.

Bolts, Stove and Tire.—Firmness is observed in quotations on Stove and Tire Bolts, some manufacturers having advanced their extreme prices about 10 per cent. The change is ascribed to the scarcity and high price of Wire referred to in connection with the advance in Carriage and Machine Bolts, noted elsewhere.

Skate Straps.—Being confronted with the necessity of paying higher prices for their material some manufacturers state that they will be obliged to advance their prices on Skate Straps the coming season. It is said that leather of the sort used in producing this line is unusually hard to obtain, especially in the better qualities.

Cotton Goods.—In anticipation of an unfavorable Cotton report indicating the probability of a short crop for the present year manufacturers of Cotton products, such as Clothes Line, Sash Cord, &c., have been suggesting the possibility of higher prices. Manufacturers apparently have good stocks on hand, as deliveries on such business as has been booked recently are said to be prompt.

Carriage and Wagon Springs.—As recently brought out in these columns the market for Carriage and Wagon Springs is decidedly firm, and some manufacturers at least seem to be considerably behind their deliveries. An advancing tendency in prices has developed within a couple of weeks, the following quotations being fairly representative of the market: Black and half bright

Springs, \$4.75 to \$5 per cwt.; Bright Springs, \$5.25 to \$5.50.

Sheet Zinc.—While quotations on Sheet Zinc are still unchanged, a decline in the market is quite generally expected by the trade. Such a movement often takes place about this time of the year, and its probability is emphasized by recent declines in the price of Spelter.

Bird Cages.—A withdrawal of their quotations on Bird Cages has been announced by leading manufacturers, and it is understood that revised schedules will show advances of a moderate character.

Vitrified Sewer Pipe.—An advance has recently been made in the price of standard Vitrified Sewer Pipe and Fittings, 3 to 24 in., by the American Sewer Pipe Company, Pittsburgh, Pa. It is understood that other manufacturers are adhering to the advance. The advance is attributable to increase in wages and the general good condition of trade. Deliveries have been retarded owing to the scarcity of cars, but during the past month there has been an improvement in this direction. The new discounts, f.o.b. factory, in carload lots are as follows:

First-class	82 %
Second-class	85 %

Tacks.—The Tack market is in exceptionally good condition, and is referred to by some of the manufacturers as in better shape than at any time for the last five years. There is an active demand, and with the increase in the cost of production there has been something of a revision of prices, many of which are higher than a short time ago. The changes are principally in papered goods, the price of bulk Tacks remaining without important modification. The market in a general way is represented by the following quotations on leading lines:

American Carpet Tacks.....	90 and 25 %
American Cut Tacks.....	90 and 25 %
Swedes' Cut Tacks.....	90 and 25 %
Swedes' Upholsterers'.....	90 and 35 %
Gimp Tacks.....	90 and 35 %
Lace Tacks.....	90 and 35 %
Trimmers' Tacks.....	90 and 25 %
Looking Glass Tacks.....	65 %
Bill Posters' and Railroad Tacks.....	90 and 40 %
Hungarian Nails.....	80 and 10 %
Finishing Nails.....	70 %
Trunk and Clout Nails.....	80 %

There is not entire uniformity in the quotations made by the different manufacturers, but the above are fairly representative of prices on small lots. In many cases jobbers having stocks on hand are enabled to sell at somewhat lower figures.

Corn Poppers.—Leading manufacturers of Corn Poppers have given out their prices for the season, beginning June 1, the figures representing an advance of about 10 per cent. over those previously ruling. Following are the regularly announced prices on less than gross lots:

1 quart, square, wire lid.....	\$0.88 per dozen.
1 quart, square, tinned lid.....	.88 per dozen.
1 quart, round.....	1.00 per dozen.
1½ quart, square.....	1.10 per dozen.
2 quart, square.....	1.35 per dozen.
Reversible	1.50 per dozen.

Wire Picture Cord.—The market for Wire Picture Cord, referred to recently in these columns as being somewhat irregular, is said to be increasingly weak. While some of the manufacturers are maintaining prices others are offering concessions of from 5 to 10 per cent.

J. Stevens Arms & Tool Company.—J. Stevens Arms & Tool Company, Chicopee Falls, Mass., announces an advance from \$2.50 to \$3 in the list price of Stevens Tip Top Pistol No. 41, the discounts remaining unchanged.

Curry Combs.—Referring to the advance in Curry Combs recently made by a number of manufacturers, as chronicled in these columns, the assertion is made that their action was conservative and was rendered imperative by heavy advances which have taken place in their materials within less than a year, especially Handles and Ferrules. Sheet steel has also increased in cost, but not as much as brass, which accounts for the fact that Brass Combs carry a considerably higher percentage of advance.

Binder Twine.—The market is quiet, if not dull, buying being below the normal. Orders have been canceled to a considerable extent in the winter wheat belt, and the estimates in the reduction in demand range much below last year's consumption. The market is not strong under these conditions, but reports do not indicate that price cutting is resorted to, to any great extent. It remains to be seen whether the market will thus hold to the end with the reduction in the acreage of small grain to be harvested. Prices are somewhat irregular, and the following may be taken as a guide to the market: Sisal and Standard, 9 to 9½ cents; 600 ft. Manila, 12 cents; Pure Manila, 13¼ to 14 cents per pound, with usual discounts for large lots, central delivery.

Rope.—The demand is fairly good, but not up to the expectations of manufacturers. Manila hemp has dropped off in price from ¼ to ½ cent per pound during the week and Jute Hemp is not strong, without, however, any change in quotations. Cordage manufacturers appear to be well supplied with Hemp, which probably accounts for some of the weakness in the Hemp market. The Rope market is also somewhat weak in the mixed grades. Quotations are as follows: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents. Pure Sisal, 9¼ cents; No. 2 quality, 7¼ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

Window Glass.—Owing to the closing down of additional hand operated factories week by week, and the fact that the quantity of Glass in manufacturers' hands is not abnormally large for the season, the Glass situation is improved to some extent. Inquiries are more numerous, but buying is confined to immediate requirements. Reports have been sent out from Pittsburgh that the factories of the National Brokerage Company will not resume operations until November. While this statement is open to question, the start will possibly be late, owing to the fact that the manufacturers identified with the company have decided not to start their plants until assurance is given of more satisfactory conditions than developed during the last fire. Locally, demand is only moderate. Minimum prices recommended by the Eastern Window Glass Jobbers' Association are as follows: Jobbers' quotations from jobbers' list October 1, 1903, Greater New York, 90 and 10 per cent. discount on all sizes, single and double strength. Outside of Greater New York, in the Eastern District, prices are not uniform, ranging from 90 and 5 for single and 90 and 10 per cent. discount for double, to 90 and 15 for single, and 90 and 20 per cent. discount for double, according to location of territory. Minimum prices recommended by the Western Window Glass Jobbers' Association are as follows: Jobbers' quotations from jobbers' list October 1, 1903: 90 and 10 per cent. for single and 90 and 15 per cent. discount for double strength Glass.

Paints and Colors.—Unsettled weather conditions has restricted the purchase of lead products to some extent, the demand for White Lead in Oil being only in fair demand. As a rule, manufacturers of mixed Paints have been very well satisfied with their business since the first of the year, while some makers state that their sales do not come up to the same period of last year, owing to the backwardness of the season. White Lead in Oil is quoted on the basis of 500 lb. or over, at 7½ cents per 100 lb.; less than 500 lb., 8 cents per pound, with a rebate of ¼ cent per pound for lots of 12 tons and over.

Linseed Oil.—The increase of the price of Seed resulted in an advance in Oil of 1 cent per gallon early in the week. In anticipation of higher prices a few contract orders were placed, but anticipating requirements was not indulged in to any extent. Jobbing demand is restricted to immediate requirements. On the new basis New York quotations for jobbing lots are as follows, according to quantity: City Raw, 45 to 46 cents per gallon; Out of Town Raw, 44 to 45 cents per gallon. Boiled Oil is 1 cent a gallon over Raw.

Spirits Turpentine.—Demand has been light on a declining market at this point. New York quotations are as follows, according to quantity: Oil Barrels, 62 to 62½ cents; Machine Made Barrels, 62½ to 63 cents per gallon.

Jim West's Ability.

Showing how a lazy clerk was awakened to his possibilities and found out that his own job was just as good as anybody else's.

BY WESTMOUNT.

JIM! Are you ever going to get up? It's 7 o'clock and snowing out. You've been late every morning this week; now see if you can't get down on time for once in your life."

"Oh, I'm awake and just going to get up. You don't need to yell at me like that. Snowing out! Great Scott, will the decent weather never come. Late again, too. I don't see why I can't fall into a soft snap like some of the fellows I know. They can sleep until 8 o'clock, and here I have to be down at that dirty warehouse by that time. Tied down to a time clock, too. I guess I'll chuck the whole bloomin' thing and hike out West. There's no chance for a chap drudging along here in a big warehouse where the boss never knows half the people who work for him. He doesn't know how we work all day filling orders, but only sees our time record and thinks we are all loafers. I wish I owned a business of my own. I wouldn't mind working hard then. I'd see something for it."

The above was the usual grumble that took place every morning while Jim was getting out of bed and into his clothes. He was employed in a large wholesale Hardware house at \$10 per week. He was a sharp boy and could do good work when he felt like it, but his besetting sin was laziness. He would get ambitious fits once in a long while—when he happened to get taken to task for some mistake—but as soon as he saw that his position was safe he drifted back into the old rut again.

It happened to be just near Christmas, and as New Year's was the time that the increases were given out for the next 12 months Jim began to hustle round and look busy, with the faint hope that some of the superfluous cash in the treasury might flow his way.

The salesmen were all in from their different territories for the yearly conference with the directors of the house; also for the purpose of "brushing up" their samples, and incidentally to partake of the hospitality of the firm in the way of a sumptuous banquet given in their honor by the company. Now it happened that one of the travelers—Jack Bryce—had occasion to visit the floor on which Jim was employed, in order to see a new line of Planes that had recently arrived

from the manufacturers, and in looking around for some one to show him where they were kept he spied Jim.

Jack Bryce's Advice. "Pardon me, old man, my name's Jack Bryce. I represent the house in —. Might I trouble you to show me where the — Planes are kept?"

"Certainly, sir," said Jim, who looked up to a traveling salesman as something superhuman, and felt highly flattered that one of them should condescend to speak to him in such a familiar way as "old man." He not only showed him where the Planes were kept, but went with him and took down parcel after parcel, at the same time explaining the mechanism in such a way that Bryce became interested in him to the extent of asking him how long he had been in the employ of the house. Jim told him that he had been there just about a year.

"What branch of the business do you intend to work up to—salesman?"

"Oh, I don't know, sir. I don't think I could ever learn to sell goods. I'd like to be a traveler, but I don't think I have the ability."

"Ability! Young fellow, any chap who has an ounce of good common horse sense and a pound of ambition in his whole makeup can learn to sell goods. I know you have the brains all right, from the way you demonstrated those Planes to me. As to the ambition, that rests with yourself."

"Oh, I don't feel very ambitious in this job. Nothing but plug away from 8 in the morning till 6 at night, and only have notice taken of you when you make mistakes.

Doesn't matter how hard you work for the firm, your salary is just the same at the end of the week as if you loafed all the time. Now, if I had a business of my own or some interest in it, so that the harder I worked the more money I'd make, I don't think I'd ever feel tired."

"So that's the way the land lies, is it? Looking for a regular feather bed and a peg to hang your hat on while the money rolls in, eh? Well, my boy, let me tell you that you'll look a long time before you get a managing director's job without plugging for it. The proverbial ladder is very long, and as we haven't got wings yet, the only way to get to the top is to climb, and the sooner you start on that journey the sooner you'll reach the resting place up above. I once had happy dreams of a milk and honey job without an owner coming along and begging me to accept it, but the boss got after me one day and told me that if I'd do more work and less dreaming I'd get along better. He gave me a long, fatherly talk, pointed out the possibilities there were for hustlers in this world, and explained that just so soon as I proved I was worth it my salary would go up. Well, I had a hard time trying to fight against laziness, but I won out, and from that day to this I've put my whole mind on my work, with the result that I'm now fixed with this firm in a nice berth. Now, my friend, take a little advice from one who has been through the mill. Settle down and do the very best you can in the job you've got. The man who can't work well for his boss will never make good for himself. Try it for a while and see."

This talk seemed to stick to Jim somehow; it filled him with new ambition, and his work seemed easy that afternoon. He thought it all over that night in bed and decided to give his job a good, square trial and see just what was in it, then fell asleep feeling better than he had for quite a while. Getting up the next morning also seemed easier, and the world had a brighter look altogether. The next day his ardor was somewhat cooled and things didn't come so easily, but he fought against the old grumbling habit, and after the first week it was plain sailing.

About six months after the above incidents had happened Jim was rather surprised to receive a command from the sales manager to report to him immediately after lunch, and began to wonder what he had done to bring down the wrath of that worthy personage upon his own humble head, and although he was sure that his work had been at least fairly satisfactory, it was with what might be termed fear and trembling that he knocked at the door of the manager's private office.

Signal Promotion. "Sit down, Mr. West, and I'll explain briefly why I sent for you. As you no doubt already know, our business in certain sections has increased so heavily that some of our representatives find it impossible to cover their respective districts as thoroughly as we would like, and we are selecting several young men from the warehouse to help them out. I'm glad to say that there has been a great improvement in you in the past six months, and as our Mr. Bryce agrees with your floor manager that you have the ability and expressed a desire that we should send you out as his assistant, I have decided to give you a trial. Your salary to start on will be \$15 per week and expenses, and I might mention incidentally that there is no limit on salaries in this firm, and it rests entirely with yourself as to what you make in future. Report to me at this hour, one week from today, when I will give you your railroad ticket and expense money enough to see you through. Good-day."

Jim did no more work that day, and it took him about 24 hr. to get over the shock. He went on the road and made good, and he claims that Jack Bryce is responsible for his success. That may be or may not be. He had the ability to make good, but needed somebody to wake him up.

It is not the job so much as the man who holds it down that counts in the long run.

THE LEONARD SYSTEM FOR BUYERS.

IN connection with the catalogue cabinet manufactured by Leonard Mfg. Company, Grand Rapids, Mich., shown in Fig. 1, a card system is provided as illustrated in the accompanying cuts, which represent the cards reduced in size. These sample cards are filled out to in-



Fig. 1.—Leonard Catalogue Cabinet.

dicating the manner in which they are designed to be used. They are of uniform size, $4\frac{1}{2} \times 6\frac{3}{4}$ in., printed in black on heavy white paper.

Catalogue Finding List.

In Fig. 2 is shown the card for finding catalogues on file, ruled for the names of firms and the bins in which the catalogues are accommodated. In the illustration the letter division is shown to be To to Tz. On the cards furnished for actual use this space is left blank, to be filled in with letters to correspond with the division made by the user of the cabinet. The cards are filed in the small drawer of the cabinet.

Cross Index for Articles.

For finding the names of all manufacturers of any one article or line shown in the catalogues in the cabinet,

FINDING LIST FOR CATALOGUES	
(Make the same division of letters that is made in the card index)	
NAME OF FIRM	CATALOGUE IN BIN NO.
Toledo Tinware Mfg. Co.	9
Troy File Works	12
Townsend, C. C. & E. P.	16

Fig. 2.—Finding List for Catalogues.

or the name of any manufacturer who makes a special article, cards like the one shown in Fig. 3 are provided, the card in this instance being devoted to Tinware. This card should contain the names of all manufacturers of Tinware whose catalogues are on file. The cross index cards may be arranged behind those of the finding list cards above referred to in the same drawer, which has space for more than 1200 cards.

Cost Price Cards.

The line to which the cost price card, Fig. 4, is devoted is Tin Pails. The columns to the right are devoted to the names of firms and addresses, below which are particulars as to the date, terms, cash discount and freight allowance. The figures beneath represent net prices, as

list prices can be found in the catalogue cabinet. It is suggested it will be found convenient if each firm's number of each size of each article quoted is writ-

ARTICLE		
TINWARE		
Use Separate Cards for each article and file under proper letter		
FIRM NAME	LOCATION	CATALOGUE IN BIN NO.
Toledo Tinware Mfg. Co.	Toledo, O.	9
National Enameling and Stamping Co.	Milwaukee	26

Fig. 3.—Cross Index for Articles.

ten in red ink just above the net price, as the numbers are not subject to frequent change. The net prices and numbers will aid in checking invoices, pricing inventories, settling disputes, &c. The last of the three columns to the extreme right may be used for the retail price; the second column for quantity or wholesale price, and the first for the cost price, which would presumably be the

ARTICLE		ADDRESS OF FIRM				
Tin Pails		Toledo Tinware Co., Toledo, O.	National Enameling and Stamping Co., Milwaukee	Quaker & Peckham, Milwaukee	Ken & Hagerly, Baltimore	
COST PRICES		Use last columns for selling prices if desired.				
DATE OF ORDER	5-10 99	5-12 99	6-1 99	6-10 99		
TERMS	60	60	30	90		
CASH DISCOUNT	2-10	2-10	00	3-10		
FREIGHT	00	00	20	00		
1 pint, covered, gross	3.00	3.25	3.50	4.00		JOB 33
1 quart, "	3.75	4.00	4.00	4.25		5 45

Fig. 4.—Cost Price Card.

lowest price quoted in the other columns. These cards afford an accurate comparison of prices in buying goods.

Movement of Stock.

To show which goods are selling readily and those which are slow in moving, the card illustrated in Fig. 5 is provided. This indicates, in the first column, the quantity of Tin Pails purchased from January to July. The next two columns show the stock on hand July 1, and the quantity ordered on that date. With continued use

MOVEMENT OF STOCK OF		DATE		DATE		DATE		DATE	
TIN PAILS		Jan. To July 1900		July 1-1900		July 21-1900		July 21-1900	
SIZE OR NUMBER		STOCK	ORDER	STOCK	ORDER	STOCK	ORDER	STOCK	ORDER
Pt. Cov'd doz.	60	24	0	20	0				
1 qt. "	120	72	0	60	0				
2 qt. "	600	0	60	0	120				
3 qt. "	120	40	0	24	0				

Fig. 5.—Movement-of-Stock Card.

the card will show what may be considered a minimum and maximum stock of each size, according to sales, which would be apt to vary with the season.

The Cabinet.

The cabinet is made of solid oak, with quarter sawed front, finished in golden oak, highly polished. It is 32 in. wide, 24 in. deep and 63 in. high, outside measurement, and is mounted on strong ball bearing casters. The upper cupboard is divided into nine compartments, each 3 in. wide and $13\frac{1}{2}$ in. high, extending back the entire

depth of the case. This is designed for bound volumes, those too thick being placed on top of the cabinet. The upper drawer is divided into 18 compartments, each $9\frac{1}{4}$ in. long by $4\frac{1}{2}$ in. deep. It is intended for small envelope catalogues, postal cards, &c. The second drawer, containing 12 compartments, each $9\frac{1}{4}$ in. long by $7\frac{1}{2}$ in. deep and 3 in. wide, is for standard 6 x 9 in. books. The small drawer to the right contains the card indexes. Just below these two drawers is a sliding shelf, which can be used as a work table. The other drawers are arranged for various sized catalogues, the bottom one, for instance, having only one partition, designed for the largest catalogues lying flat, size $20\frac{1}{4}$ in. long by $12\frac{3}{4}$ in. wide, inside measure. Each bin is numbered, and the numbers on the drawer pulls include the numbers on the bins.

THE NATIONAL RETAIL CONVENTION AT BOSTON.

W. H. BENNETT, 40 Dearborn street, Chicago, Ill., who with G. R. Lott is in charge of the special train which will leave Chicago with Western visitors to the convention of the National Retail Hardware Association at Boston, June 18 to 21, issues a circular in which particulars are given concerning various railroad rates for the journey, including Chicago to Boston and return direct, Chicago to Boston and returning via New York, and Chicago to Boston and returning via New York and the Jamestown Exposition. The tickets via Jamestown are limited to 60 days, with stopover at Niagara Falls; Boston, 10 days; New York, 10 days; Philadelphia, 10 days; Baltimore, 10 days, and Washington, 10 days. The Chicago special train will leave that city at 1.45 p.m. on Saturday, June 15, from the La Salle street depot over the Lake Shore and Michigan Southern Railroad, and delegates can be picked up at Toledo, Ohio, at 7.50 p.m., and at Cleveland at 10.30 p.m. the same day. It is expected to spend one day at Niagara Falls, leaving there Sunday evening for Boston. The headquarters of the party in Chicago will be at the Great Northern Hotel, Jackson Boulevard and Dearborn street. Those expecting to board the train at some other point should com-



J. Stevens Arms & Tool Company's Location Map.

municate with Mr. Bennett, who will then make arrangements to send a card, advising in regard to the berth or section reserved on the train.

F. Alexander Chandler, who is secretary of the Boston committee in charge of arrangements for the convention, reports that accommodations are being made for an attendance of 1101 at the annual ladies' night banquet, 666 covers being set in one of the large halls of the Ford Building and 435 in another. The musical programme on this occasion will be furnished by a woman's orchestra and vocal club. The tickets are already meeting with a large demand, and the guests will include all of the visiting delegates of State retail Hardware associations,

as well as many representatives of the manufacturing and jobbing trade of New England. Mr. Chandler also states that the membership of the New England Association, which will hold its annual convention during the same week, has increased about 60 per cent. in the last eight weeks.

The J. Stevens Arms & Tool Company, Chicopee Falls, Mass., issues a very cordial invitation to convention visitors to come and inspect its extensive plant, and in this connection has sent out the map reproduced herewith, somewhat reduced in size. This will be recognized as a unique evidence of the enterprise shown by many manufacturers in keeping their plants and products conspicuously before the trade. It will be observed that the map indicates the location of Chicopee Falls and the distance it is from Boston, New York and Albany, the time occupied in making the trip, &c. The card of the company accompanying the map informs the recipient that the company's "latch string is always on the weather side."

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM DEY & CHICKADONZ, Kimball, Kan., who have succeeded to the Hardware, Implement, Vehicle and furniture business of U. S. Kelsey.

FROM BUCK & GREENE, St. Albans, Vt., who have bought out the plumbing business of E. R. Hazard, and conduct a combined Hardware and plumbing establishment.

FROM R. B. HOBSON, who has recently opened a new Hardware and House Furnishing Goods store at Mount Vernon, N. Y.

FROM MICKEL, FRAZIER COMPANY, Woodbine, Iowa, which has succeeded the Hardware firm of Mickel & McEuen.

FROM MILLER, GATES & Co., Headrick, Okla., which has purchased the Bonebrake-Hightower stock of Hardware and Implements and the Hardware, Implement and furniture stock of B. C. Majors. The members of the new firm are F. M. Miller, Ben Gates and B. C. Majors.

FROM THE BOMAR-SUMMERS HARDWARE COMPANY, Louisville, Ky., which has been incorporated with a capital stock of \$20,000, and will handle Shelf and Heavy Hardware, Stoves and Tinware, Paints and Oils, Sporting and Athletic Goods. The store occupied by the new company has been equipped throughout with Warren shelving. The incorporators are H. V. Bomar, G. A. Metz and C. M. Summers.

FROM RICHARDSON & SONS, LIMITED, general commission merchants, 51a Billiter Buildings, Billiter street, London, E. C., England, who have recently incorporated their business, and with the greater facilities now at command are desirous of extending the number of lines handled by them. They will be pleased to receive catalogues and quotations from American manufacturers of Hardware lines who wish to do a European and British Colonial trade.

FROM LIGHTHISER HARDWARE COMPANY, Baltimore, Md., which has just opened for business with a full line of Hardware and Tools.

FROM NICHOLS WIRE COMPANY, Kansas City, Mo., jobber of Bale Ties, Nails and other Wire products, who would like to hear from manufacturers of goods that can be handled to advantage in connection with these lines.

Export Trade Topics.

PRACTICAL SUGGESTIONS ON EXPORT TRADE.

Eighth Article.—FOREIGN DRAFTS.—(Continued.)

Foreign exchange varies, not only according to the state of the money market and the law of supply and demand, but according to the time that the bill has to run. That is, in general, according to the length of time that must elapse before the returns from the bill arrive back in London or New York, as the case may be. Thus, if the rate for a sight draft on London be quoted at \$4.83 to the pound sterling, as it happens to be as this is written, a similar rate for a 60-day bill (60 days after sight) will probably be about \$4.78. In other words, interest is reckoned at about $\frac{1}{2}$ of 1 per cent. per month. And at the same time that a sight bill on London is quoted at \$4.83, a sight bill on some other part of the world might be quoted as low as \$4.80, because it is estimated that 30 days must elapse "beyond London," or, say, two weeks' mail time out to place of destination and two weeks more for the returns to reach London. There are various other considerations which also affect rates of exchange. All usually are for the account of the customer, and the necessity of drawing the draft in a sufficient sum to realize the anticipated amount is evident enough.

Modifications That May Be Introduced in Drafts.

Other details connected with the drawing of foreign drafts ought to be mentioned. In the cases of drafts on Australia and some other parts of the world there is what is called the "Colonial clause," which ought to be included. This simply specifically provides for the collection from drawee in addition to the face of draft of the cost of bill stamps, interest, &c., and obtains for the draft rates of exchange as though it were drawn directly on London.

Similarly a clause is sometimes written in drafts on new or unusual markets, unfamiliar or undesirable to New York bankers, specifying payment by drawee of interest and collection charges up to approximate date of arrival of returns back in London. This also is designed to secure London rates of exchange, which are always the best available, even other English cities commanding slightly lower rates. But all such clauses first ought to be thoroughly understood and agreed upon between manufacturer and customer, otherwise disagreement and friction is sure to result.

"In Case of Need" Clause.

One phrase, however, it is more desirable to incorporate in drafts whenever the drawer has either his own London office or has a competent, trustworthy local agent in the immediate vicinity of the city on which draft is drawn. This is the "in case of need" clause, and advises the bankers who present the draft to drawee to refer to the nearby local agent in case of any trouble over payment, or advises the London bankers through whose hands the bill had passed on its journey from this country to apply to the drawer's London office for advice or assistance in case of similar difficulty.

When Drafts Are Protested.

In case drafts are not paid or are not accepted in accordance with instructions given to transmitting banks, such drafts are always protested and the presenting bank telegraphs its London correspondent, to whom alone it is responsible; it in turn cables the New York bank who passed them the documents, and the latter promptly demands the refund by the manufacturer of the amount for which the bill was sold or discounted, further presenting in due course an account for protest fees and cable and other expenses involved. There is but one thing to do in such cases—pay it promptly. It will often be found that protest occurred through some technicality or misunderstanding or because errors had been made in invoices, or otherwise.

A protest of a draft does not by any means always indicate that the amount involved is a final loss. Usually

the customer should immediately be cabled for an explanation, and sometimes the New York bank should be asked to cable instructions to present again. When the customer for any reason positively refuses to pay or is unable to pay, then the manufacturer must be guided by circumstances and his best judgment. The goods, it must be remembered, are the bank's so long as it retains the bill of lading. The local bank may be instructed through its New York correspondent to offer reductions or allowances or otherwise compromise with drawee, to sell the goods locally to the best advantage, to return them to America or to forward them to some other customer elsewhere.

It is often desirable to avoid selling by auction at place of first destination if it can well be avoided, for it is a frequent trick of some dishonest merchants, particularly in the Orient, to refuse drafts in the expectation that goods will be so sold, afterward buying them in at much less than original cost. In the same way instructions may be sent, always through the New York bankers who have started the documents on their travels, in regard to accepted drafts that have been refused and protested. A bank protests immediately. It sometimes happens that the debtor is a little slow and makes no account of one or two days' delay.

It should be noted that in some countries nonpayment of an acceptance authorizes an immediate petition in bankruptcy against the delinquent debtor, and in any case much more can be accomplished on the ground. Foreign bankers may usually be trusted to put the papers into the hands of a competent local attorney for action, if instructed to do so, in fact to use intelligent discretion in handling such cases under instructions.

How Documents Should Be Forwarded.

Foreign drafts need not be discounted unless preferred. Bankers will forward them for collection if desired. In some cases the manufacturer will wish to forward his documents directly to his customer, for instance, when goods have already been paid for. In any case the use of duplicate documents should be understood. Duplicates are thought necessary on account of the many perils of foreign mails and to obviate the great delay and possible loss that the destruction or misarrying of one document would mean. A complete set of the documents is therefore sent forward by one mail, and the duplicate set by the next succeeding mail.

Bills of lading or in fact any other valuable documents or even important letters destined for foreign countries ought invariably to be registered. It is sometimes amusing to note the American disinclination to use the registered mail. The additional cost is very small, the protection secured considerable. Further, drafts and documents must always be promptly prepared and forwarded either to bankers or to customers as may be necessary.

The bills of lading must reach the consignee or be at his disposal at least as soon as the goods themselves and no delay should be tolerated in dispatching them. If bills of lading are forwarded through a bank, with or without an accompanying draft, the customer should be immediately notified of the facts, and the triplicate copy of invoice sent him with general information as to the shipment.

(To be continued.)

FRANK S. BIGLER, who for the past 20 years has been with the Michigan Bolt & Nut Works, Detroit, Mich., 10 years as secretary, has resigned. Mr. Bigler sailed June 5 on the steamer Statendam for a brief vacation in Europe, and on his return, about the middle of July, will become associated with the Upson Nut Company, Cleveland, Ohio.

THE PITTSBURGH AUTOMATIC VISE & TOOL COMPANY, Pittsburgh, Pa., manufacturer of the Pittsburgh line of Vises, has recently placed its St. Louis, Mo., business in the hands of the Southwestern Engineering & Supply Company of that city. The Southwestern Company will carry a large supply of the Vises in stock and will be in position to fill all orders promptly.

THE GIFFORD-PINEL COMPANY.

THE GIFFORD-PINEL COMPANY, 140 Pearl street, Boston, Mass., for whom David B. McIlwaine, 42 Broadway, New York, is agent, has recently been organized, and has just issued a well printed illustrated price-list showing the Contractors' and Quarrymen's Tools which it manufactures. These include Contractors' Picks, Timber, Beam and Stone Tongs, Tools for pneumatic machinery, Hammers of all kinds, Road Roller Picks, Steel Construction Tools, Chisels, &c. The company calls special attention to the quality of its products, which will be offered under the G-P brand. Mr. McIlwaine is also agent for the Pittsburgh Shovel Company, Pittsburgh, Pa.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

STUDEBAKER BROS. MFG. COMPANY, South Bend, Ind.: Catalogue No. 268, devoted to Dump Wagons, Farm Carts, Street Cleaners' Carts, Hand Carts, Street Sweeping Machines, &c.

DE WITT WIRE CLOTH COMPANY, 299 Broadway, New York: Catalogue No. 76, relating to Wire Cloth and Netting, Rope, Sash Cord, Guards, Office Railing, Copper Cable Lightning Rods, Screen Wire Cloth, &c.

FELTON, SIBLEY & Co., Philadelphia, Pa.: Catalogues devoted to Varnishes and Colors, Paints, Fillers, Enamels, Stains, Wax Polish, Varnish Removers, Furniture Polish, &c.

E. R. ALLEN FOUNDRY COMPANY, Corning, N. Y.: Pamphlet illustrating and explaining the Boss Potato Digger.

OLIVER CHILLED PLOW WORKS, South Bend, Ind.: Illustrated Catalogue E of Walking, Sulky and Gang Plows, Eveners, &c. The catalogue is accompanied by a separate price-list.

ROYAL GAS LIGHT COMPANY, 210 E. Kinzie street, Chicago, Ill.: Catalogue No. 4, illustrating and describing the Royal Gem Systems of Lighting, also Chandeliers, Lamps, Globes, &c.

THE STUART & PETERSON COMPANY, Burlington, N. J.: Catalogues Nos. 211, 213, 214 and 216, covering appliances for chemists, druggists, bottlers, butchers, soap manufacturers; Hot Water Stoves, Stills, Retorts, Steam Vegetable Boilers, Filter Boxes, Tilting Kettles, &c.

THE HUDSON MFG. COMPANY, Hudson, Mich.: Catalogue of Hudson Bicycles in women's and men's models; also Bicycle accessories.

E. HOWARD WATCH COMPANY, Waltham, Mass.: Catalogue illustrating, listing and describing a line of Gentlemen's Watches.

THE SNOW & PETRELLI MFG. COMPANY, New Haven, Conn.: Printed matter relating to Joe's Marine Reverse Gears and Friction Clutches, Yacht Cannon and Boat Specialties, Nail Clippers, Nail Pullers, Key Rings, Automatic Shoe Lace Exhibitors, &c.

NATIONAL MFG. COMPANY, Sterling, Ill.: Catalogue entitled Ornamental Ideas, devoted to illustrating and describing Half Surface Door Butts, Nos. 350 and 400, the latter being the latest design.

ROYAL MFG. COMPANY, Lancaster, Pa., Herbert Porzer & Co., 149 Church street, New York, representatives in New York City and the New England States: Printed matter illustrating a line of Grinders or Tool Sharpeners; also a pamphlet entitled Practical Talks About Practical Grinders.

THE MERRIAM MFG. COMPANY, Durham, Conn.: Illustrated catalogue of Cash and Bond Boxes and other tin goods. It includes Cash Boxes of a variety of types and sizes; Covered and Open Document Boxes; Bond Boxes,

Stamp Boxes, Office Boxes and Cash Tills; Post Office Boxes and Postal Card Boxes; Billhead Cases, Envelope Cases and Carbon Paper Cases; Card Holders; Rules and Paper Folders and Check Cutters; Mail Delivery or House Letter Boxes; the Hubbard Voucher File; Boxes for Safe Deposit Vaults; Makeup Boxes for theatrical purposes and Fishing Tackle Boxes.

HEINZ & MUNSCHAUER, Buffalo, N. Y.: Catalogue and price-list, relating to Zero, Buffalo, Polar and Enameled Refrigerators.

OWOSSO MFG. COMPANY, Owosso, Mich.: 1907 catalogue and price-list of Owosso Snow Shovels.

NEY MFG. COMPANY, Canton, Ohio: Illustrated catalogue No. 18, referring to Hay Carrying Tools and Equipment, Merchandise Carriers, Hoists, Lawn Mowers and Rakes, Barn Door Hangers and Rail and Hardware Specialties.

M. A. LOVE MFG. COMPANY, Rockford, Ill.: Illustrated catalogue and price-list of Iron Lift and Force Pumps, Iron, Brass and Brass Lined Cylinders, &c.

KIRK-LATTY MFG. COMPANY, Cleveland, Ohio: Illustrated catalogue of Juvenile Express Wagons, Velocipedes, Barrows, Coaster Wagons, Bob Sleds, &c. The company lists the Hercules All Steel Wagon, which is an addition to its line, and has made a number of improvements in its Comet Hand Car.

ROME MFG. COMPANY, Rome, N. Y.: Catalogue E, issued May 1, covering its regular lines of Nickel Plated Copper Ware and Brass and Copper Specialties.

ENGLISH & MERSICK COMPANY, New Haven, Conn.: Illustrated catalogue of an extensive line of Automobile Fixtures, Forgings, Mountings, Trimmings and Interior Fittings.

STARR MFG. COMPANY, Dartmouth, Nova Scotia: Forty-first annual catalogue of Ice Skates, containing also rules for the game of hockey.

J. R. DAWSON MFG. COMPANY, Philadelphia, Pa.: Catalogue No. 17 of household and office Wire Goods for all purposes, in bright silver, luster and gilt finish.

WINONA WAGON COMPANY, Winona, Minn.: Catalogue No. 16, illustrating, describing and listing Rushford and Winona Wagons.

GANDY BELTING COMPANY, Baltimore, Md.: Booklet, price-list, &c., referring to Stitched Cotton Duck Belting.

BUTLER BROS., 495-497 Broadway, New York: June issue of "Our Drummer" catalogue, with special reference to summer leaders, sporting goods and Fourth of July supplies.

CANEDY-OTTO MFG. COMPANY, Chicago Heights, Ill.: Leather bound descriptive price-list No. 8, covering its line of Forges, Blowers, Drills, Chucks, Tuyere Irons, Countershafts and Blast Gates.

THE AMERICAN MFG. & NOVELTY COMPANY, Erie, Pa., has gotten out an attractive little souvenir in the shape of an aluminum comb. It carries the suggestion that the merchant recipient "Comb out an order for good wood goods." The company is manufacturing Extension and Sectional Ladders and Household Woodenware, such as Clothes Bars, Wash Benches, Ironing Tables, Skirt Boards, Pastry Boards, &c.

THE ENTERPRISE ENAMEL COMPANY, Bellaire, Ohio, whose Crown Roaster was described in our issue, May 16, finds that the word Crown in connection with an article of this sort has already been copyrighted by another manufacturer, and the company has therefore decided to change the name of its Roaster to the Corona, under which style it will hereafter be known. By the ingenious method of construction the bottom of this Roaster cannot touch the oven, so that meat may be cooked until tender without burning, the cover keeping every whiff of grease and moisture inside.

THE SHENANDOAH STEEL WIRE COMPANY, Buffalo, N. Y., announces that Hazen Brown has been elected vice-president and general manager, succeeding W. W. Gibbs, deceased.

Hardware Window Display

NINTH ARTICLE.

THE adaptability of Sporting Goods to attractive window display and the profit to be derived by Hardware merchants from this popular line were referred to in the last article of this series. We are presenting in Fig. 27 an illustration of a window devoted to Fishing Tackle, a line which is now seasonable in many sections of the country.

A Suggestion for Our Readers.

In this connection we would call the attention of our readers to the fact that they can greatly aid us in the preparation of window display matter for our columns if they will send us any descriptions and illustrations of the methods they employ. It is by no means necessary to

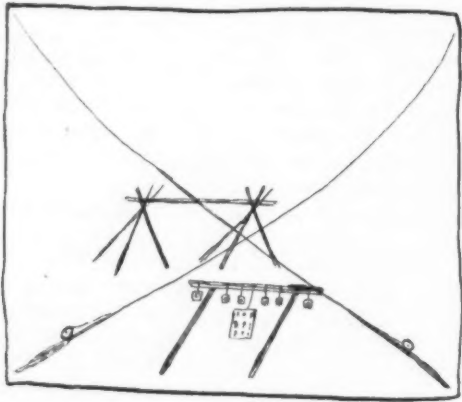


Fig. 26.—Rough Sketch Submitted with Description of Fishing Tackle Display.

send descriptions of full windows, as any little ideas and devices that have been found available for use and successful in attracting the public and advancing the interests of the store will be highly acceptable. While our articles are fully illustrated we do not need drawings or photographs of special merit in order to get the results desired. The roughest sketches and poorest photographs, accompanied by an explanation giving a list of the articles displayed and other particulars, will enable our artists to make a finished and creditable drawing.

For example, a short time since we received the rough

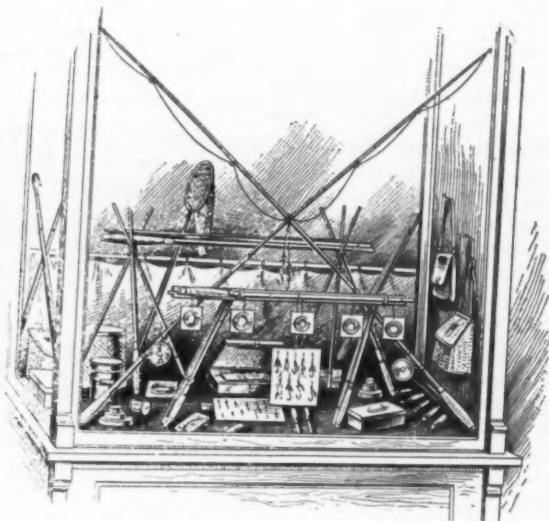


Fig. 27.—Window Display of Fishing Tackle Based on Fig. 26.

sketch indicating methods of displaying Fishing Rods shown herewith.

Our correspondent also sent us in connection with this very crude drawing some particulars as to the arrangement of the display, explaining that the horizontal Rod in the foreground was supported against the glass of the window by two other Rods used as props, while coils of Fishing Line, with a sample card of Hooks, Files,

Artificial Bait, &c., were suspended from it. He also stated that Rods were stacked like guns in the background, with another rod lying horizontally across the stack, while two full length Rods, with Lines and Reels attached, were placed diagonally in the window. He also mentioned other articles used in the display, such as Bait Boxes, Fish Baskets, Nets, &c., and described their position in the window. With the drawing thus submitted and the explanation given our artists were able to evolve the finished picture of the window exhibit presented in Fig. 27.

Our readers will thus understand that from very



Fig. 28.—An Inviting Freezer Display.

rough sketches as well as from poor photographs we are in a position to prepare very satisfactory pictures of window exhibits and ideas, and we shall therefore be glad to be favored with anything in this line in accordance with the suggestion already made.

Freezers Attractively Presented.

There is no more effective way to display Ice Cream Freezers than to show one in connection with a table tastefully set with fresh linen, china, silverware, &c., for

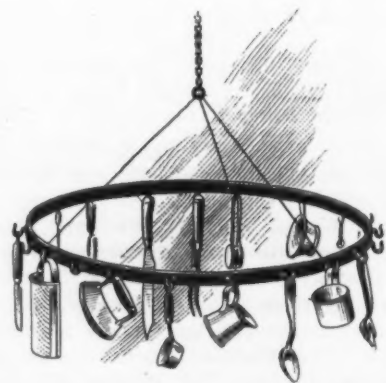


Fig. 29.—Display Rack Made of a Child's Rolling Hoop.

serving ice cream and cake. The Freezer should be open nearby and seem to contain a quantity of appetizing cream, which, of course, must be imitated, as the real cream could not be kept from melting. Cornstarch pudding would afford an excellent substitute for ice cream to be used in this way. As shown in Fig. 28, the display is embellished by a couple of potted plants and other accessories of a cozy corner. The Freezers illustrated are not priced, but this could be done by cards tacked on the tubs, at the discretion of the merchant.

A Rack for Small Articles.

A convenient piece of window equipment for use from time to time can be made by taking an ordinary child's rolling hoop and covering it with some plain colored ma-

terial, either cloth or paper. Cloth is better, as it is more durable. On the outer surface of the hoop, as shown in Fig. 29, hooks may be screwed in at regular intervals on which a considerable variety of goods may be hung for display. The device should be hung from a hook in the ceiling of the window by a small brass or nickel chain, to which the hoop may be attached by three short lengths to

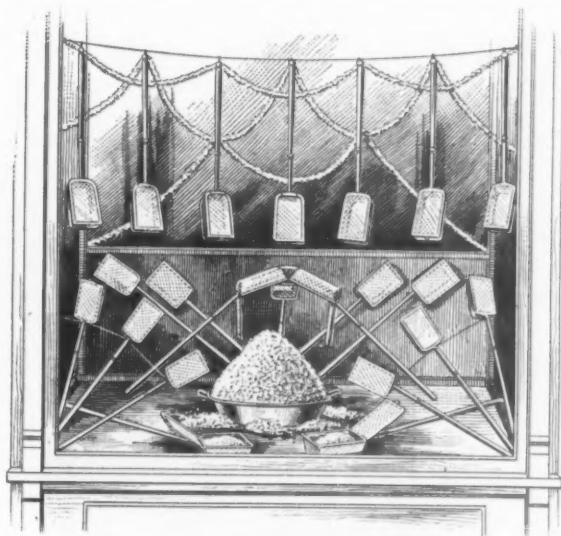


Fig. 30.—A Corn Popper Window.

keep it in a horizontal position, as illustrated. As here shown, it is used to support a considerable assortment of commonplace kitchen utensils, but it is adaptable for the display of a variety of small articles.

Display of Corn Poppers.

The very attractive exhibit of Corn Poppers reproduced in Fig. 30 is an excellent example of the display of an article in connection with its product. As will be observed, a large quantity of freshly popped corn fills a deep pan in the center of the window, above which three

EFFECTIVE SPRING STORE CIRCULARS.

WE have several times had the opportunity of calling attention to the efficient advertising methods of the John E. Bassett & Co., New Haven, Conn. In a recent issue we reproduced several spring advertisements inserted by this firm in the daily papers. Herewith are reproduced three equally timely one-page circulars, which the firm is using in pushing its sales of Lawn Mowers, Fly Screens and Garden Hose. These circulars are not only inclosed in correspondence, invoices, statements, &c., but are also exceedingly convenient to hand to inquirers in the store. Each affords practically all needed information as to its particular line, and although clear and emphatic is so neat and unobtrusive as to command the most respectful attention. It may well be believed that the tactful use of these circulars will save time, not only for customers, but for clerks as well, and afford a customer something tangible to carry home and refer to in considering his requirements. It can hardly be doubted that this sort of service tends to the greatest possible number of sales.

THE recent organization of the Council Bluffs Sheet Metal Company, Council Bluffs, Iowa, furnishes an interesting solution for the competitive difficulties that sometimes arise between the tin and sheet metal working departments of Hardware stores in the larger cities and towns. Formerly the principal Hardware stores in Council Bluffs, which include P. C. DeVol Hardware Company, Paddock-Handschy Hardware Company and Charles Swaine, each ran a sheet metal shop in connection with its business. Noting the saving that might be effected in buying and expense if all of this business were consolidated and operated under one management, the sheet metal interests of the several concerns named, together with that of the Grahl Petersen Company, manufacturer of cornice and sheet metal work, were merged into the Council Bluffs Sheet Metal Company. The new company has been incorporated with a capital stock of \$25,000, and plans are being made for the construction of a two-story brick building, 60 x 100 ft., for its ex-

Lawn Mowers

that cut the grass

Season of nineteen hundred seven

IMPERIAL HIGH WHEEL	"The Best"
14 in. 16 in. 18 in. 20 in.	
\$9.00 \$9.50 \$10.50 \$11.50	
VICTORY BALL BEARING	"Easy running"
16 in. 18 in. 20 in. 22 in.	
\$9.50 \$10.50 \$11.50 \$12.50	
GREAT AMERICAN	"Runs like a bike"
15 in. 17 in. 19 in. 21 in.	
\$9.50 \$10.50 \$11.50 \$12.50	
LAKEWOOD BALL BEARING	"High grade"
14 in. 16 in. 18 in.	
\$7.00 \$7.50 \$8.00	
GILT EDGE	"A popular high wheeler"
14 in. 16 in. 18 in.	
\$6.00 \$6.50 \$7.00	
OUR 1784	"Honesty built"
12 in. 14 in. 16 in.	
\$4.50 \$4.75 \$5.00	
OUR I. X. L.	"An easy pusher"
12 in. 14 in. 16 in.	
\$4.00 \$4.25 \$4.50	
OLD GREEN	"Best for the price"
12 in. 14 in. 16 in.	
\$2.95 \$3.15 \$3.35	

Every Mower Warranted

The John E. Bassett & Co.
754 CHAPEL ST. - 320 STATE ST.

FLY SCREENS

Season of 1907.

In sizes to fit most places
And prices to fit most purses

Adjustable Window Screens

HEIGHT	WIDTH	PRICE
18 inches	21 to 33 inches	30 cts. each
24 "	21 to 33 "	35 "
28 "	23 to 37 "	45 "
30 "	21 to 33 "	47 "
30 "	23 to 37 "	47 "
30 "	25 to 42 "	52 "

Special Screen Doors

Three Panel Screen Doors, } \$1.50 each
Antique Oak Finish . . . }

Five Panel Screen Doors, } \$2.25 each
Natural Wood Finish . . . }

Four Panel Screen Doors, } \$2.50 each
Antique Oak Finish . . . }

The four and five panel doors are very strong
and well finished.

Sizes } 2 ft. 6 in. x 6 ft. 6 in. 3 ft. 8 in. x 7 ft.
of } 2 ft. 8 in. x 6 ft. 8 in. 2 ft. 10 in. x 7 ft.
Doors } 3 ft. x 7 ft.

The John E. Bassett & Co.
754 CHAPEL ST. - 320 STATE ST.

GARDEN HOSE

SEASON OF 1907.

Every foot we sell represents
full value for what you pay.

BRAND	DESCRIPTION	PRICE	50 feet with nozzle
NORTH STAR	Good for the price and warranted for the season.	3/4 in. 3 ply. \$.10	\$5.00
WATERSIDE	A low priced hose for high pressure.	3/4 in. 5 ply. .10	5.00
J E B SPECIAL	A good light hose of good stock.	3/4 in. 3 ply. .10	5.00
J E B WIRE BOUND	The same grade bound with wire.	3/4 in. 3 ply. .12	6.00
J E B "1784"	A heavy four-ply hose—our best seller.	3/4 in. 4 ply. .14	7.00
MASCOT	A fine hose for high pressure.	3/4 in. 7 ply. .13	7.50
WALLABOUT	Made of high-grade stock—a new brand.	3/4 in. 3 ply. .15	7.50
DOUBLE DIAMOND	Our old stand-by. Lots of real rubber in it.	3/4 in. 3 ply. .18	9.00
DOUBLE D COTTON	The highest grade of cotton hose blue stripe.	3/4 in. .15	7.50

REELS FROM 75 CENTS UP.

The John E. Bassett & Co.
754 CHAPEL ST. - 320 STATE ST.

Three Spring Circulars of the John E. Bassett & Co., New Haven, Conn.

Poppers are stacked. Other Poppers are arranged about the window, some being hung from a wire in the background, while the artistic effect is heightened by the use of festoons of threaded corn, such as are often seen on Christmas trees.

(To be continued.)

clusive occupancy. Since its organization all contracts for tin and sheet metal work secured by the Hardware stores is sublet to the new company. The officers are as follows: Theo. N. Petersen, president; Charles Swaine, vice-president; E. L. Duquette, secretary; George Handschy, treasurer.

A NOTABLE TUBE RACK.

PETER A. FRASSE & CO., 92-94 Fulton street New York, have recently built an immense Tube Rack at their Tube and Steel warehouse, 142-144 Worth street, which they believe to be the largest rack in existence for carrying a merchant stock of Tubes for distribution to the trade. This house, established in 1816, is the Eastern distributor of Shelby Steel Tubes, made by the Shelby Steel Tube Company.

Although the rack here illustrated was designed and constructed to contain seamless Steel Tubes, general interest in the various structural features is justified owing to its adaptability for holding equally well other kinds of Tubing, Rods, Shafting, Bar Iron, Tool Steel, Bar Steel and kindred materials, with possibly some modifications, that may suggest themselves according to the specific use to which a rack of such character may be put.

Outline of the Rack.

The rack, Fig. 1, is 54 ft. long, 14 ft. high and built of yellow pine and spruce timber. The sizes of bins are

Subdivided and Graduated Space.

From front to back the rack is 16 ft. deep and is divided into four sections, the first two of which are 3 ft. deep, the third 3 ft. 6 in. and the last two each 4 ft. 6 in. deep, thus properly sustaining any length of Tubing from 3 ft. 6 in. up to pieces 16 or 18 ft. long. These uprights are firmly secured by pieces separating one from the other on both ceiling and floor to keep them apart, so that if the racks should become released from the ceiling they would still be held and protected from a front and back motion.

Gallery Foot Walk.

The rack has a gallery 7 ft. from the floor, reached by means of stairs at each end, the intermediate footway greatly assisting in the passing of material from the floor to an employee on the upper tier. The gallery is 30 in. wide and is built of 1½-in. yellow pine. The supports that sustain the footing are of 6 x 1¼ in. timbers bolted to the first two uprights every 3 in., which are apparently amply sufficient to support the weight. There is also a

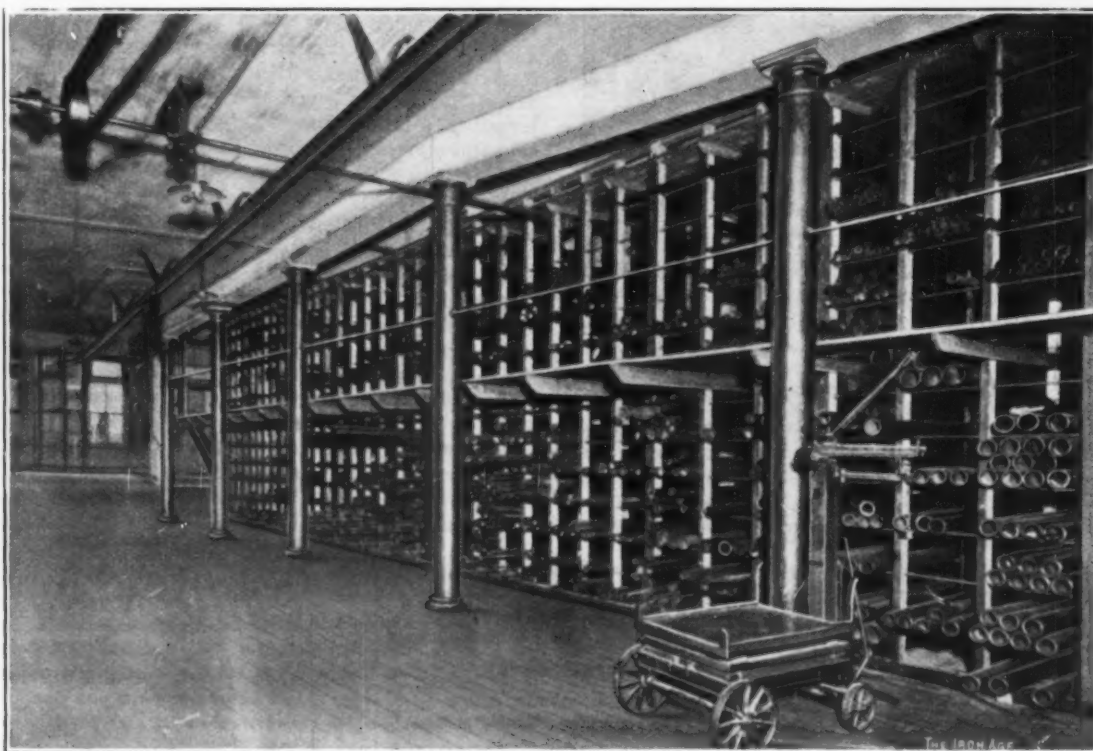


Fig. 1.—Tube Rack Adaptable Also to Rods, Bars, Shafting, &c.

graded laterally, starting with a 6-in. separation at the front and ending with an 18-in. opening at the rear of the room. Each space from floor to ceiling is 12 in. high. By grading the sizes it is possible to use the smaller spaces for small sized Tubes and so on up the larger spaces for the larger diameters of Tubes. The upright timbers are 2 x 4 in. and 4 x 4 in., every fifth upright being of 4 x 4 in. material. This method strengthens the rack against any side sway tendencies. Every five uprights are so bolted together in the center as to keep that section from spreading and so on throughout the entire length. Each single upright is separated both at top and bottom by a ¾-in. strip, to keep them apart.

Precautions Against Water Damage.

The cross pieces upon which the Tubes rest are made of ½-in steel rods and are 12 in. apart, the first opening being 3 in. from the floor so that in the event of fire and the floor becoming wet or damp, the stock in the bottom racks will not be damaged. Above the rack and below the ceiling is a waterproof roof of tarred roofing felt having a board foundation, which, supplemented with the tarpaulins spread by the Fire Underwriters' Salvage Corps in the event of fire, back and front, would amply protect the entire contents from water damage.

guard or handrail of 1¼-in. wrought pipe bolted to the large iron columns, as a precaution against accident.

Designating the Spaces.

The openings in the rack are lettered from the ceiling to the floor, A to M, inclusive, designating individually each of the 13 spaces. The letters extend the entire length of the rack, and are numbered from the front end horizontally up to 40, making 520 distinct receptacles for material, so that with the assistance of two charts one can readily determine the exact location of any size of stock.

Method of Utilizing all Space.

This detail is especially helpful whenever it becomes necessary to store any given size in two or more places which is frequently the case whenever there is a larger quantity of certain sizes on hand than there is room for in their proper places; a condition that is constantly varying and cannot be foreseen. Long experience has taught that it is much better to have a larger proportion of the smaller spaces for material than of the large bins, as it is better to use two or three spaces for a size rather than to have one large space only partially filled.

Factors of Safety.

The 4 x 4 in. upright timbers in the rack are let into the ceiling, imparting additional strength; the intervening 2 x 4 in. timbers, however, are not mortised into the ceiling. In the building containing this rack there is a brick wall directly beneath the rack, which is an additional factor of safety. The rack is 5 ft. from the back wall, which permits of the use of the wall space for storing on end bars of tool steel, encircling the entire rack. The rack itself is in a room, 50 x 80 ft., and being 5 ft. from the rear wall, leaves a space of 21 ft. from the

Chart Helps.

Fig. 1 illustrating the front of rack is a view looking toward the front of the warehouse. Fig. 2 is a partial view of one of the charts indicating the bin spaces and size of Tubes, both diameter and gauge of metal. Fig. 3 is a subsidiary chart by means of which various sizes temporarily out of their proper place and put in the nearest available section or sections are instantly located. By the use of the latter chart it is possible to intelligently use all the space in the rack in extreme cases, its efficiency depending solely on the care with which it is

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	$\frac{1}{4} \times 20$	$\frac{1}{4} \times 18$	$\frac{1}{2} \times 24$	$\frac{3}{8} \times 24$	$\frac{1}{2} \times 24$	$\frac{3}{8} \times 24$	$\frac{1}{2} \times 24$	$\frac{3}{8} \times 24$	1×24	$\frac{1}{2} \times 24$	A	$\frac{1}{16} \times 24$			$\frac{3}{8} \times 19$					
B	$\frac{3}{8} \times 24$	$\frac{1}{2} \times 18$	$\frac{1}{2} \times 18$	$\frac{3}{8} \times 18$	$\frac{1}{2} \times 18$	$\frac{3}{8} \times 18$	$\frac{1}{2} \times 18$	$\frac{3}{8} \times 18$	$\frac{1}{2} \times 18$	$\frac{3}{8} \times 18$	B	$\frac{1}{16} \times 18$	1×15	$\frac{1}{16} \times 18$	$\frac{1}{8} \times 8$					
C	$\frac{3}{8} \times 24$	$\frac{3}{8} \times 18$	$\frac{1}{2} \times 22$	$\frac{1}{16} \times 22$	$\frac{3}{8} \times 22$	$\frac{1}{16} \times 22$	$\frac{3}{8} \times 22$	$\frac{1}{16} \times 22$	$\frac{3}{8} \times 22$	$\frac{1}{16} \times 22$	C	$\frac{1}{16} \times 22$	1×22	$\frac{1}{16} \times 22$	$\frac{1}{8} \times 22$					
D	$\frac{1}{16} \times 24$	$\frac{1}{16} \times 18$	$\frac{1}{2} \times 16$	$\frac{1}{16} \times 16$	$\frac{3}{8} \times 16$	$\frac{1}{16} \times 16$	$\frac{3}{8} \times 16$	$\frac{1}{16} \times 16$	$\frac{3}{8} \times 16$	$\frac{1}{16} \times 16$	D	$\frac{1}{16} \times 16$	1×16							
E	$\frac{1}{4} \times 22$	$\frac{1}{4} \times 16$	$\frac{1}{2} \times 20$	$\frac{1}{16} \times 20$	$\frac{3}{8} \times 20$	$\frac{1}{16} \times 20$	$\frac{3}{8} \times 20$	$\frac{1}{16} \times 20$	$\frac{3}{8} \times 20$	$\frac{1}{16} \times 20$	E	$\frac{1}{16} \times 20$								
F	$\frac{3}{8} \times 22$	$\frac{3}{8} \times 16$	$\frac{1}{2} \times 17$	$\frac{3}{8} \times 17$	$\frac{1}{4} \times 17$	$\frac{3}{8} \times 17$	$\frac{1}{4} \times 17$	$\frac{3}{8} \times 17$	1×17		F									
G	$\frac{3}{8} \times 22$	$\frac{3}{8} \times 16$	$\frac{1}{2} \times 14$	$\frac{1}{16} \times 14$	$\frac{3}{8} \times 14$	$\frac{1}{16} \times 14$	$\frac{3}{8} \times 14$	$\frac{1}{16} \times 14$	$\frac{3}{8} \times 14$		G									
H	$\frac{1}{16} \times 22$	$\frac{1}{16} \times 16$	$2\frac{3}{8} \times 13$	$2\frac{3}{8} \times 13$	$2\frac{3}{8} \times 13$	$2\frac{3}{8} \times 13$					H									
I	$\frac{1}{4} \times 20$	$\frac{3}{8} \times 17$	$\frac{1}{2} \times 13$	$\frac{1}{16} \times 13$	$\frac{3}{8} \times 13$	$\frac{1}{16} \times 13$	$\frac{3}{8} \times 13$	$\frac{1}{16} \times 13$	$\frac{3}{8} \times 13$		I									
J	$\frac{3}{8} \times 20$	$\frac{1}{16} \times 16$	$\frac{1}{2} \times 10$	$\frac{3}{8} \times 10$	1×10	$\frac{3}{8} \times 10$					J									
K											K									

Fig. 2.—Chart Showing Plan of Rack Bins.

Dia.	34 ga.	33 ga.	31 ga.	30 ga.	29 ga.	28 ga.	27 ga.	26 ga.	25 ga.	24 ga.	23 ga.	22 ga.	21 ga.	20 ga.	19 ga.	18 ga.	17 ga.	16 ga.	15 ga.	14 ga.	13 ga.	12 ga.	11 ga.	10 ga.	9 ga.	8 ga.	
$\frac{1}{16}$	1-A	1-B	1-C	1-D	1-E	1-F	1-G	1-H	1-I	1-J	1-K	1-L	1-M	1-N	1-O	1-P	1-Q	1-R	1-S	1-T	1-U	1-V	1-W	1-X	1-Y	1-Z	
$\frac{1}{8}$	2-A	2-B	2-C	2-D	2-E	2-F	2-G	2-H	2-I	2-J	2-K	2-L	2-M	2-N	2-O	2-P	2-Q	2-R	2-S	2-T	2-U	2-V	2-W	2-X	2-Y	2-Z	
$\frac{3}{16}$	3-A	3-B	3-C	3-D	3-E	3-F	3-G	3-H	3-I	3-J	3-K	3-L	3-M	3-N	3-O	3-P	3-Q	3-R	3-S	3-T	3-U	3-V	3-W	3-X	3-Y	3-Z	
$\frac{1}{2}$	4-A	4-B	4-C	4-D	4-E	4-F	4-G	4-H	4-I	4-J	4-K	4-L	4-M	4-N	4-O	4-P	4-Q	4-R	4-S	4-T	4-U	4-V	4-W	4-X	4-Y	4-Z	
$\frac{3}{4}$	5-A	5-B	5-C	5-D	5-E	5-F	5-G	5-H	5-I	5-J	5-K	5-L	5-M	5-N	5-O	5-P	5-Q	5-R	5-S	5-T	5-U	5-V	5-W	5-X	5-Y	5-Z	
$\frac{7}{8}$	6-A	6-B	6-C	6-D	6-E	6-F	6-G	6-H	6-I	6-J	6-K	6-L	6-M	6-N	6-O	6-P	6-Q	6-R	6-S	6-T	6-U	6-V	6-W	6-X	6-Y	6-Z	
$\frac{15}{16}$	7-A	7-B	7-C	7-D	7-E	7-F	7-G	7-H	7-I	7-J	7-K	7-L	7-M	7-N	7-O	7-P	7-Q	7-R	7-S	7-T	7-U	7-V	7-W	7-X	7-Y	7-Z	
$\frac{1}{16}$	8-A	8-B	8-C	8-D	8-E	8-F	8-G	8-H	8-I	8-J	8-K	8-L	8-M	8-N	8-O	8-P	8-Q	8-R	8-S	8-T	8-U	8-V	8-W	8-X	8-Y	8-Z	
$\frac{1}{8}$	9-A	9-B	9-C	9-D	9-E	9-F	9-G	9-H	9-I	9-J	9-K	9-L	9-M	9-N	9-O	9-P	9-Q	9-R	9-S	9-T	9-U	9-V	9-W	9-X	9-Y	9-Z	
$\frac{3}{16}$	10-A	10-B	10-C	10-D	10-E	10-F	10-G	10-H	10-I	10-J	10-K	10-L	10-M	10-N	10-O	10-P	10-Q	10-R	10-S	10-T	10-U	10-V	10-W	10-X	10-Y	10-Z	
$\frac{1}{2}$	11-A	11-B	11-C	11-D	11-E	11-F	11-G	11-H	11-I	11-J	11-K	11-L	11-M	11-N	11-O	11-P	11-Q	11-R	11-S	11-T	11-U	11-V	11-W	11-X	11-Y	11-Z	
$\frac{3}{4}$	12-A	12-B	12-C	12-D	12-E	12-F	12-G	12-H	12-I	12-J	12-K	12-L	12-M	12-N	12-O	12-P	12-Q	12-R	12-S	12-T	12-U	12-V	12-W	12-X	12-Y	12-Z	
$\frac{7}{8}$	13-A	13-B	13-C	13-D	13-E	13-F	13-G	13-H	13-I	13-J	13-K	13-L	13-M	13-N	13-O	13-P	13-Q	13-R	13-S	13-T	13-U	13-V	13-W	13-X	13-Y	13-Z	
$\frac{15}{16}$	14-A	14-B	14-C	14-D	14-E	14-F	14-G	14-H	14-I	14-J	14-K	14-L	14-M	14-N	14-O	14-P	14-Q	14-R	14-S	14-T	14-U	14-V	14-W	14-X	14-Y	14-Z	
$\frac{1}{16}$	15-A	15-B	15-C	15-D	15-E	15-F	15-G	15-H	15-I	15-J	15-K	15-L	15-M	15-N	15-O	15-P	15-Q	15-R	15-S	15-T	15-U	15-V	15-W	15-X	15-Y	15-Z	
$\frac{1}{8}$	16-A	16-B	16-C	16-D	16-E	16-F	16-G	16-H	16-I	16-J	16-K	16-L	16-M	16-N	16-O	16-P	16-Q	16-R	16-S	16-T	16-U	16-V	16-W	16-X	16-Y	16-Z	
$\frac{3}{16}$	17-A	17-B	17-C	17-D	17-E	17-F	17-G	17-H	17-I	17-J	17-K	17-L	17-M	17-N	17-O	17-P	17-Q	17-R	17-S	17-T	17-U	17-V	17-W	17-X	17-Y	17-Z	
$\frac{1}{2}$	18-A	18-B	18-C	18-D	18-E	18-F	18-G	18-H	18-I	18-J	18-K	18-L	18-M	18-N	18-O	18-P	18-Q	18-R	18-S	18-T	18-U	18-V	18-W	18-X	18-Y	18-Z	
$\frac{3}{4}$	19-A	19-B	19-C	19-D	19-E	19-F	19-G	19-H	19-I	19-J	19-K	19-L	19-M	19-N	19-O	19-P	19-Q	19-R	19-S	19-T	19-U	19-V	19-W	19-X	19-Y	19-Z	
$\frac{7}{8}$	20-A	20-B	20-C	20-D	20-E	20-F	20-G	20-H	20-I	20-J	20-K	20-L	20-M	20-N	20-O	20-P	20-Q	20-R	20-S	20-T	20-U	20-V	20-W	20-X	20-Y	20-Z	
$\frac{15}{16}$	21-A	21-B	21-C	21-D	21-E	21-F	21-G	21-H	21-I	21-J	21-K	21-L	21-M	21-N	21-O	21-P	21-Q	21-R	21-S	21-T	21-U	21-V	21-W	21-X	21-Y	21-Z	

Fig. 3.—Section of Chart Locating Excess Stock Stored in Other Bins.

front wall, which gives ample space to turn the tubes before pushing them into the various subdivisions.

Traveling Crane.

In front of the rack is an overhead traveling crane, with a differential block which will lift from the truck at the curb up to 2 tons of material, depositing it anywhere inside the building adjacent to the rack, and with the assistance of a cradle lifting it to a position in front of the rack so that material can be readily put away. The rack when the illustration was made contained, it was estimated, about 200 tons of tubing.

Tube Cutting Equipment.

The facilities for cutting Tubes in accordance with specifications include eight cutting off machines, there being two Circular Saws, three Hack Saws, one Fox cutter and one cutting off lathe for facing and removing any burr on the Tube.

kept. Given a rack constructed on these principles and the charts here shown it is a simple matter to handle a large stock of any analogous material, without unnecessary loss of time, and also know instantly whether a wanted size is on hand.

ENSIGN, BICKFORD & Co., Simsbury, Conn., have been succeeded by Ensign-Bickford Company, which has absorbed the Climax Fuse Company and has established New York offices at 261 Broadway. The company will manufacture all varieties of Climax Fuse, and will keep up the brand name while at the same time continuing the production of the lines of Ensign, Bickford & Co. The officers of the new corporation are R. H. Ensign, president; J. R. Ensign and H. S. Chapman, vice-presidents; C. E. Curtiss, secretary, and L. S. Ellsworth, treasurer.

THE REVIVAL OF THE BICYCLE.

BY S. M. S.

THE Bicycle is recovering its hold on the public and the volume of sales is becoming greater each year. In 1904 it was estimated that the total number of Bicycles made in the United States was a scant 200,000, and of this amount a large number were shipped abroad on export orders. In 1905 the figures ran up to 300,000 Bicycles, and the manufacturers began to show more live interest in the line. When, however, in 1906 the sales reached the half-million mark, it didn't take a large amount of shrewdness to see that the tide had turned in earnest, and that the Bicycle had gained a place in public favor that was destined to be permanent and lasting. The factory managers conservatively estimate that for 1907 the sale of Wheels will reach at least 750,000, and plans are well under way for turning out this amount.

Right Now Is the Time for Hardware Merchants

who are planning to make an effort to capture the Bicycle trade of their section to bestir themselves. The riding season is at hand and it is high time that they were informing the public that they are in position to supply them with easy running Bicycles. A full line of Bicycles will attract attention to any Hardware store. They can be had in any color, grade and equipment, and in sizes to suit all ages. From this latter fact alone the importance of carrying a full line of Wheels is apparent.

The wise Hardwareman will do well also to put in a few rubber tired Velocipedes, as they come under the same general class and are likely to prove a most profitable venture. Bicycle Sundries also yield a profitable trade at this season, especially when displayed in an attractive manner. Lots of Hardware merchants have no idea how much a line of up to date Bicycles and Sundries will improve their trade and prestige, as well as add to their bank account, simply because they never have tried selling them.

Bicycle Window Display.

Of course, a great deal depends upon the manner in which Bicycles are presented to the customer, the method of floor and window display, and the ease with which they may be shown up and handled. If the Hardwareman would catch the passing Bicycle trade, he should by all means make a Bicycle window display. It's by the show windows that the majority of people learn each year of the approach of the riding season, and the chances are that the effect of an attractive window display will be felt immediately by the owner of the store. Observation proves that this applies in the country as well as in the city.

The Reasons Why.

There are reasons why the Bicycle is again in popular public favor. One of the reasons is that the price has struck rock bottom, and even at the present low prices the Bicycles sold to-day are the best equipped and most scientifically constructed mounts ever made. Another reason is that as a durable and practical machine, adapted to a great variety of useful purposes, the Bicycle is safe, sure, economical and always ready. Its first cost is only a fraction of any other conveyance, while the cost of keeping it is practically nothing. Its value as a money saver can perhaps be best appreciated by those who have occasion to journey to and from home to business a certain number of times daily. A little calculation will serve to show how soon a Bicycle, as a substitute for street car service, can be made to pay for itself.

As a means of exercise the Bicycle brings into alert and healthful activity every nerve and muscle of the body. It moves with its rider like a thing of life, and adds to the mere physical exercise the exhilaration of rapid flight in the open air, and the interest of constantly changing scenes.

The public is out and ready to spend money for Bicycles. If merchants are wise they will get a line of Wheels worth selling, place them where they can be seen, and then shout—business is as sure to come as sunshine.

THE CLERKS' BOOK.

A NEAT pocket volume, 5¼ x 4 in. in size and containing about 100 pages, is "The Clerks' Book," written by Frank Farrington and published by the Merchants' Helps Publishing Company, Delhi, N. Y. The price is 25 cents, postpaid. The scheme of the little book is succinctly stated in the preface of the author, who declares that while no end of books have been written for merchants, there are but few for their employees. This book is written with the express purpose of helping the clerk and tells things which will interest him more than any one else. Needless, to say, however, the ideas will be quite as interesting and suggestive to employers as employees. The author well suggests that the book should not be read entirely through at one time, but should be taken in small doses and digested. There is no attempt to write a connected treatise, practical suggestions and maxims in epigrammatic form being merely collected. The following paragraphs afford an excellent idea of the contents of the volume.

There's as much in the way you treat customers as in the goods you give them

Every man knows more about something than you do. Get your acquaintance to talk to you about that something. That's the way to learn things.

Keep your individual expenses on a cash basis. There is only one rule for the man on a salary, and that is, "Pay as you go." If you can't pay, don't go.

It doesn't pay to recommend goods a bit higher than they will stand. A customer fooled that way once won't give you a second chance.

Greet every customer as soon as he comes in. If you can't wait on him at once, at least find out if possible what he wants, so as not to keep him waiting needlessly.

There's a right way to do everything about the store. It seems to be human to pick out the wrong way first. At least see that you do not make the same mistake twice.

You clerks ought to be the most careful readers of the store's advertising. If you're not, that advertising will lose half its effect.

You can do a lot toward keeping the store from being "just out" of things. Watch your part of the stock like a hawk.

When you see customers passing you by and taking the trouble to get another clerk to wait on them, just take the trouble to find out how the other fellow does it.

It's a wise clerk who takes pains to know more than he is expected to know about the goods he sells.

Learn when you have said enough about the goods you are selling. Know when to stop talking and leave it to the customer.

Don't abuse the privileges which the proprietor accords you. Privileges are to be used, not misused. They are yours by courtesy rather than by right.

STIMULATING SALESMEN'S EFFORTS.

IN calling attention to the remarkable record of the plant for March, F. E. Myers & Bro., Ashland, Ohio, a short time since sent their traveling force the stimulating and appreciative letter given below. It will be observed that due recognition is given to the work of the salesmen, while the importance of intelligent and well directed energy and industry is also emphasized:

We produced goods and shipped during March at the rate of over \$2,000,000 per annum.

Some thought it could not be done; others thought it could; still enough knew it could be done to do it. The busy man is always in demand. The busy company is sought, rather than the company that has done something, or that is going to do something in the future.

Therefore, every traveler who has lifted a catalogue in the battle for the largest business in our history, aggregating considerably over a *Pump a minute*, and a corresponding number of Hay Tools, &c., aggregating more than a *finished implement every half minute*, has won a victory for himself and for our company.

Our reports disclose a record of every representative. Some have larger territory than others. You are individual producers. The whole work, however, has been remarkable. Individual production in the way of order getting and introduction is a commendable feature, and the man who has it is seldom without work.

It goes without saying that you have the gratitude of the management and office for the success of the month, and the determination of every one to push on to greater things will receive proper appreciation. We hope the above will be encouraging to you as it has been to us.

AMONG THE HARDWARE TRADE.

The firm of Case & Frazier, Magnolia, Iowa, has been dissolved and succeeded by the Case Hardware Company, of which D. R. Chambers is manager.

The Daum & Helm Hardware Company has been formed to conduct the Hardware business in Allegheny City, Pa. The incorporators are Ernest C. Daum, John G. Helm and Edward Helm, all of Allegheny City.

The Itasca Hardware & Furniture Company, Itasca, Texas, has recently been incorporated with a capital stock of \$20,000. The incorporators are T. C. Carlisle, M. C. Easter, W. R. Carr, E. A. McElroy and M. A. Thomas.

McIntosh Hardware Company, Kalispell, Mont., is enlarging the stock of its branch store at Eureka, Mont. The company also has a Hardware stock at Whitefish valued at about \$5000, which it intends to close out.

The Carroll County Hardware Company, Berryville, Ark., has been incorporated with an authorized capital of \$25,000. J. N. Reff is president of the concern and E. B. Hinchman, manager.

The C. Trautman Company, Pittsburgh, Pa., whose Hardware store was destroyed some weeks ago, has purchased property 72 x 123 ft. at 1716-1718 Sidney street, and is having plans prepared for the erection of a warehouse of slow burning construction. It will be three stories in height and will cost about \$15,000.

August F. Metzler, Mackinaw, Ill., contemplates the addition to his stock of General Hardware, a line of Bugles and furniture, and for the accommodation of his expanding business is about to build a new brick storehouse, 42 x 86 ft., two stories in height.

C. C. Macke has succeeded Young & Knode in the Hardware business at Hebron, Neb.

The Tucker Hardware Company, Hot Springs, Ark., has recently been incorporated with a capital stock of \$25,000. The following officers have been elected: S. W. Tucker, president; H. W. Watson, vice-president; E. L. Huddleston, secretary.

Mr. McGregor has sold his interest in the McGregor-Farr Hardware Company, Burlingame, Kan., to Mr. Miner. There is no change in the style of the concern.

Empfield, Leonard & Co. have succeeded to the Hardware and furniture business of Empfield & Leonard, Anselmo, Neb.

MISCELLANEOUS NOTES.

Billings & Spencer Company's Hammers.

Billings & Spencer Company, Hartford, Conn., has added to its well-known line of hammers a new line of plain eye and jewelers' riveting hammers, the high quality of which is especially emphasized. They are drop forged of high grade hammer steel and polished all over. The handles are of clear hickory, thoroughly seasoned. The company has recently issued a circular illustrating, describing and listing this line, and referring also to the round and octagon pattern machinists' hammers, which it manufactures in ball pein, straight pein and cross pein styles.

Perolin Dustless Sweeping Compound.

H. W. Johns-Manville Company, 100 William street, New York, has completed arrangements for the exclusive selling agency for Perolin throughout the United States. The company states that Perolin is the original fireproof sweeping compound, invented 50 years ago by a German chemist and long a standard article in Germany. It is said that it will not only settle and absorb the dust disturbed by sweeping, but that it will, owing

to chemical properties, clean, brighten and preserve carpets, rugs and floorings and save curtains, tapestries, pictures and furniture from much soil and discoloration. Perolin is a compound of the consistency of a coarse meal containing chemical oils, and where used avoids the necessity of continual scrubbing of wood and kindred surfaces. In use a train is laid across one end of a room, whether on carpet or parquet floor, and the substance swept over the floor surface of whatever character, instead of sprinkling and then sweeping it off. The result is an absorption of dust particles, germs, &c., as the Perolin is swept along. Among its component parts is a powerful disinfectant for destroying disease germs characteristic of dust and, it is said, leaving the air purer and in a more wholesome condition, in addition to a cleaner floor. It is put up in tin lithographed canisters to retail profitably at 35 and 60 cents each, and in 100 lb. drums.

Resawed Box Shooks.

The high price of lumber has resulted in many manufacturers seeking to reduce in some way the cost of box shoos. George W. Dinsmoor, 22-32 West street, Lawrence, Mass., to meet this demand is making a specialty of resawed shoos from $\frac{3}{8}$ to $\frac{1}{2}$ in. in thickness. It is stated that this thickness is great enough for many lines of goods, where heretofore much thicker shoos have been used. By the use of resawed shoos a material saving is effected not only in the cost of the shoo, but in freight as well. Besides resawed shoos Mr. Dinsmoor makes a specialty of two colored printed shoos, which combination, it is stated, permits of many attractive designs being used. He is prepared to furnish promptly white pine box shoos of any size.

The Improved Duplex Model Comptometer.

The Comptometer, made by Felt & Tarrant Mfg. Company, Chicago, Ill., is shown in the accompanying illustration. While retaining all of the improved features of previous models, the new Duplex is provided with a raised dial which has been enlarged and elevated to bring the figures announcing the result of calculations into full view from any position. In former models the dial was located in an angle of an offset at the front of the machine, which afforded a less conspicuous view of the figures. Considering the wide range of work done by the



The Improved Duplex Model Comptometer.

machine, including as it does arithmetical operations involving addition, subtraction, division and multiplication, its mechanism is not intricate or complicated. Its operation is also simple. The depression of keys corresponding to the numbers to be added causes the total sum to appear on the register dial. With each repetition the sum is correspondingly increased up to a final limit of 9,999,999 for the eight column machine. The only lever movement necessary is a single pull of the side lever upon completion of an addition or other calculation, to set the dial back to zero. The Comptometer is designed for service in general office accounting and relieves much of the drudgery of such work. It is light and easily handled, being 5 in. high to top of keys, and weighing 15 lb.

Keystone Insulated Range Boiler Cover.

The insulated range boiler covering shown in the accompanying cut is put on the market by H. W. Johnson-Manville Company, 100 William street, New York. The cover is made of a thick layer of Keystone hair insulator, faced with asbestos on the side next the boiler. It is covered with a canvas jacket, provided with hooks, so that it can be fastened in place on the boiler by lacing with wire. The covering is furnished ready to apply, can be put on in a few minutes and keeps the heat in the boiler, where it is required. It is pointed out that the covering will keep the water hot when the fire is low and keep the kitchen cool during the hot summer months. The cover is furnished in two sections, complete with wire for fastening. When applying, the long section is first placed over the boiler and laced with wire. The second, or lower, section is then put on and laced. If desired, the cover can be painted with gold or aluminum paint, or finished in any color to harmonize with the surroundings.



Keystone Insulated
Range Boiler
Cover.

The Brown & Sharpe Pocket Scriber.

The pocket scriber shown in the accompanying cut is of a new design and is provided with a removable point which can be reversed in the handle. This gives added convenience to the tool and insures safety when it is desirable to carry it in the pocket. The point is tempered



Brown & Sharpe Pocket Scriber.

and is held in the handle by a four-jawed chuck, by which it can be set concentrically and held firmly in any position. The handle is knurled for a finger grip and is provided with a hexagonal head to prevent rolling when the tool is laid on the bench. The scriber can be closed for carrying to about $3\frac{1}{2}$ in. in length. It is manufactured by the Brown & Sharpe Mfg. Company, Providence, R. I.

The Easy Can Opener.

The F. W. Loll Mfg. Company, Meriden, Conn., is putting on the market a new can opener, as shown in the cut. It consists of a cast iron handle, to which is riveted a nickel plated blade of high grade steel. The tool differs from the accepted practice of can openers in that its



The Easy Can Opener.

motion is the reverse, pressing downward, causing the blade to cut. It is stated that the Easy can opener, as it is called, leaves no sharp edge to cut the fingers after a can is opened.

The Anchor Washing Machine.

S. McGranahan, Davenport, Iowa, is offering the washing machine shown herewith. It is a high speed, light running rotary machine, having both balance wheel and crank. The dasher is reversed by two beveled gears,

working alternately at top and bottom, the gears being entirely covered. The dasher reverses with comparatively little lost motion, turning and re-turning with one revolution of the crank. To each revolution of the crank the balance wheel revolves at about the rate of 200 revolutions per minute, which is referred to as giving such a momentum to the wheel that when the dasher reverses there is no jerking or unsteadiness to the running. The washer tub is made of cypress, and has corrugated sides and bottom. The hoops and castings are all aluminum



The Anchor Washing Machine.

bronzed. The main frame and half of the gear covering is cast in one piece. The machine has the improved dasher, and, it is pointed out, the dasher post does not project through the bottom of the block.

The Magic Churn.

The Magic barrel churn, here shown, is an addition to the line of the American Woodenware Mfg. Company, Toledo, Ohio. It is fitted with the company's new patent drop steel forged cover, which, it is asserted, does away with warping, splitting or breaking. Attention is also called to the fact that there is no cast iron about the

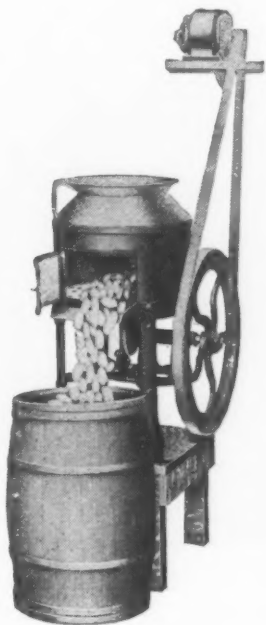


The Magic Churn.

churn, and the manufacturers regard it as practically indestructible. Every cover is said to fit exactly, admitting no leak. Three sizes are made: No. 0, holding 6 gal. and weighing 31 lb.; No. 1, holding 10 gal. and weighing 36 lb., and No. 2, holding 15 gal. and weighing 44 lb.

Sterling Vegetable Peeler.

N. R. Streeter & Co., Rochester, N. Y., represented in metropolitan territory by W. H. Jacobus, 155 Chambers street, New York, have put on the market the Sterling vegetable peeler, the accompanying illustration showing a 16-in. motor driven machine, but which can be used equally well with hand power by the addition of a wood handle placed as provided in the rim of the flywheel. The manufacturers say that regardless of the great saving in time and drudgery, the economy in material peeled aggregates 20 to 25 per cent. in competition with the ordinary knife peeling operation. The quantity of potatoes or other vegetables that each size of machine is capable



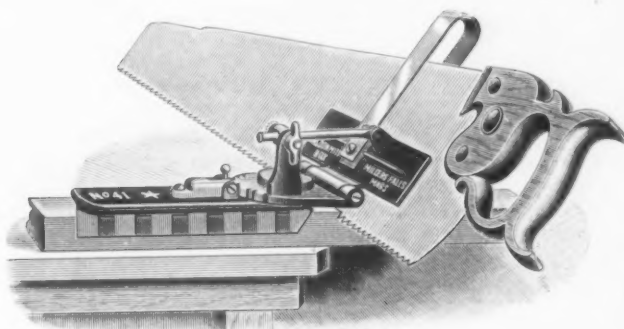
Sterling Vegetable Peeler with Motor Attached.

of treating at a time is peeled in 45 seconds, the 26-in. machine with one attendant doing the work usually accomplished by 15 girls. Carrots, turnips, onions, &c., can be prepared for cooking in the same machine. The working parts consist principally of a cylinder mounted on a stand, open at the top, having a cover with a hopper into which is thrown the charge of potatoes. The cylinder is stationary. At the bottom is a revolving disk which, producing a centrifugal motion, throws the potatoes against the sides of the cylinder, agitating them so that as the disk revolves 200 to 300 times per minute every part of the potato strikes cylinder and disk. Both disk and cylinder are coated by a secret process with a waterproof coating of diamond flint, producing a surface similar to very coarse sandpaper, which scrapes the skin off as the vegetable strikes it. While some of these machines in constant use have shown no appreciable depreciation, the replacement of disk or cylinder, the makers say, is both easy and inexpensive. The patented method of attaching the abrasive material consists in the use of an enamel baked on at a high temperature, which fuses the flint cutting surface into the enamel, making one body and producing a sharp pointed interior practically indestructible. Full instructions accompany each machine for setting up, proper speed, &c. Water is introduced through the hose on the cover, which is distributed over the revolving potatoes, keeping both vegetables and machine clean. Waste water runs out of the back of the iron stand into a suitable receptacle or sewer connection. Potatoes can be put in while the machine is in motion, there being no necessity for stopping any power driven machine. When potatoes have been sufficiently revolved the door outlet is opened and they drop into the receptacle, finished so far as peeling is concerned, although it is more economical to cut out bruises, decayed portions or deep eyes by hand rather than lose the waste resulting from a longer stay in the machine.

The manufacturers claim for this mode of treatment that vegetables are not bruised, will not discolor by standing or in cooking. The machine is run at comparatively low speed, so that vegetables are not thrown with force against the cylinder sides, but are gently agitated and the skin removed by the fine flint surface. These peelers are made in 13-in. diameter cylinder, for hand power only; 16 in., for either hand or power, and 20 and 26 in., for power only, the requirement of the three power machines being $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ hp. respectively. The shipping weights are respectively 125, 140, 140, 175 and 245 lb. each.

Millers Falls Miter Box No. 41.

Millers Falls Company, 28 Warren street, New York, has added an improvement to its No. 40 miter box, in the arrangement to accurately cut all bevels, miters and angles shown in the accompanying cut. It will be found particularly useful in jointing flooring, the manufacturer explains. In addition to the above arrangement, the box is adjustable at once to the various required angles, and being provided with a double shelf or rest, it will cut



Millers Falls Miter Box No. 41.

either a right or left angle with equal ease. The box is made entirely of iron and steel, japanned, with bright parts polished and nickel plated. Either a panel or back saw can be used.

Clutch Screw Driver.

The clutch screw driver shown in the illustrations is shown in the catalogue of F. W. Lott Mfg. Company, Meriden, Conn. The tool is provided with a clutch which holds the head of the screw, whether flat, round headed or machine screw, so that it can easily be started without



Fig. 1.—Clutch Screw Driver with Screw in Clutch.

the preliminary boring of a starting hole or a blow of a hammer. While the right hand holds the handle and the left hand the spring just below the clutch, a pull of the handle opens the clutch, which is held in the position by the left hand while the right inserts the screw. The release of the spring sets the screw in place. Once started on the work the clutch is easily released, leaving



Fig. 2.—Clutch Screw Driver with Spring Drawn Back Showing Bit.

the tool to work like any ordinary screw driver, or the work may be completed with the clutch holding the screw. The screw driver is made of steel, with highly polished handle, and in three sizes, 12, 8 and 5 in. It is also furnished with square end to fit any brace, in 12 and 15 in. sizes.

A New Armory Decapper.

The Ideal Mfg. Company, New Haven, Conn., manufacturer of cartridge reloading tools, has just put on the market a new implement for use in military armories or other places where great quantities of 30-40 U. S. Krag or 30 U. S. Springfield cartridge shells are reloaded. The implement will be catalogued as the Lightning decapper. It is made especially for expelling the spent primers from 30-40 U. S. Krag and 30 U. S. Springfield shells that have



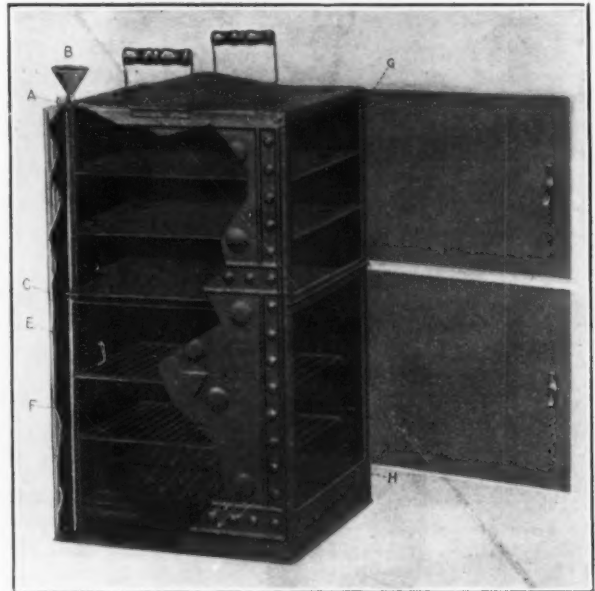
A New Armory Decapper.

been fired. It is claimed by the manufacturers that 20,000 shells may be readily decapped in 10 hr. With one stroke of the plunger the primer is expelled and the shell ejected. It is made to be clamped to a bench or table, thus leaving both hands free to handle the shells, and takes up but little space. The frame is made of cast iron, sufficiently strong. It is japan finished, the plunger and pin are made of steel, there is nothing to get out of order, and with proper care it is stated should last a lifetime.

The Ohio Steam Cooker and Combination Hot Air Oven.

The Ohio Cooker Company, Toledo, Ohio, is offering the steam cooker and combination hot air oven shown herewith, the illustration being broken away to show the interior construction of the device. It is designed to

roast and brown meats, bake cakes, pies, bread and biscuits in the lower compartment, while in the upper part it cooks by steam. All this is accomplished over one burner of an oil, gas or gasoline stove, at the same time making a saving in fuel and time. The oven part is lined with heavy metal. There are three shelves in the oven, adjustable to different spaces, and two shelves in steam compartment. The partition separating the two compartments is tight. The heat from the flame goes up the side partition, the same as in ordinary ovens, and then comes out at the lower side and radiates throughout the oven, giving an even heat. An opening in the lower side provides draft and the same temperature throughout the oven. The doors are hung on brass hinges, and the water reservoir in the bottom is all double seamed and



The Ohio Steam Cooker and Combination Hot Air Oven.

heavily soldered. The cooker is made with heavy tin and copper tanks, and is equipped with a whistle that blows 10 min. before the tank needs replenishing with water. The tank is filled and emptied at the funnel on the top of the cooker. It is made in two sizes, 24 in. high and 13½ in. square for family use, and 27 in. high and 14½ in. square for hotel use.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—		Miscellaneous—		Blue, Ultramarine.....		Black, Ivory.....	
table Oils—	gal	Barytes:		Brown, Vandyke.....	@16	Lamp, Com.....	@ 6
Linseed, City, raw.....	@45	Amer. floated.....	@ ton 19.00@20.00	Green, Chrome.....	@16	Blue, Celestial.....	@ 6
City, Boiled.....	@46	Off color.....	@ ton 13.00@16.50	Green, Paris.....	@21	Blue, Chinese.....	@33
State and Western, raw.....	@43	Chalk, in bulk.....	@ ton 3.00@3.25	Sienna, Raw.....	@15	Blue, Prussian.....	@32
Raw Calcutta, in bbls.....	@70	In bbls.....	@ 100 lb. @ .35	Sienna, Burnt.....	@15	Blue, Ultramarine.....	@15
Lord, Extra Prime, Winter.....	@78	China Clay, Imported.....	@ ton 11.00@17.50	Umber, Raw.....	@14	Brown, Spanish.....	@ 1
Extra No. 1.....	@58	Cobalt, Oxide.....	@ 100 lb. 2.50@2.60	Umber, Burnt.....	@11	Carmin, No. 40.....	\$3.10@3.25
No. 1.....	@52	Whiting, Commercial.....	@ 100 lb. .43@.52			Green, Chrome, ordinary.....	3/4@ 7
Cotton-seed Crude, f.o.b. mills.....	@..	Gilders.....	@ 100 lb. .55@.66			Green, Chrome, pure.....	@17
Summer Yellow, Prime.....	@..	Ex. Gilders.....	@ 100 lb. .60@.65			Lead, Red, bbls., 1/2 bbls., kegs.....	@ 7 1/2
Summer White.....	@63					Litharge, bbls., 1/2 bbls., kegs.....	@ 7 1/2
Yellow Winter.....	@62					Ocher, American.....	@ ton \$8.50@16.00
Sperm, Crude.....	@69					American Golden.....	2 1/2@ 3 1/4
Natural Winter.....	@73					French.....	1 1/4@ 2
Bleached Winter.....	@76					Foreign Golden.....	@ 4
Bleached Winter, Extra.....	@..					Orange Mineral, English.....	@12
Tallow, Prime.....	@61					French.....	@12
Whale, Crude.....	@36					German.....	@12
Natural Winter.....	@47					American.....	8 1/4@ 9
Bleached Winter.....	@49					Red, Indian, English.....	4 1/4@ 6
Extra Bleached Winter.....	@51					American.....	3 @ 3 1/4
Menhaden, Brown, Strained.....	@33					Red, Turkey, English.....	4 @10
Light Strained.....	@33					Red, Tuscan, English.....	7 @10
Northern.....	@27					Red, Venetian, Amer.....	@ 100 lb. \$9.50@1.25
Southern.....	@26					English.....	@ 100 lb. \$1.15@1.60
Cocunut, Ceylon.....	@ 10 3/4@ 9 1/2					Sienna, Italian, Burnt and	
Cochin.....	@ 10 1/2@ 10 1/4					Powdered.....	3 @ 9
Cod, Domestic, Prime.....	@36					Italian, Raw, Powdered.....	3 @ 7
Newfoundland.....	@42					American, Raw.....	1 1/4@ 2
Red, Elaine.....	@47					American Burnt and Pow'd.....	1 1/4@ 2
Saponified.....	@ 7 1/4					Talc, French.....	@ ton \$18.00@25.00
Olive, Italian, bbls., Yellow.....	@1.00					American.....	@ ton 15.00@25.00
Neatsfoot, Prime.....	@57					Terra Alba, French.....	@ 100 lb. .90@ 1.00
Palm, Logos.....	@ 7 1/2					English.....	
						American.....	
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Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, $\frac{1}{2}$ doz. pairs, Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, $\frac{1}{2}$ doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvils..... $\frac{1}{2}$ doz. @ \$4.00
Hay-Budden, Wrought..... $\frac{1}{2}$ doz. @ \$4.00
Trenton..... $\frac{1}{2}$ doz. @ \$4.00

Imported—

Peter Wright & Sons, $\frac{1}{2}$ doz. 84 to 349 lb. 114; 350 to 600 lb. 114c.

Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....15%
Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....33%

Augers and Bits—

Com. Double Spur, 7045 @ 7045
Jennings' Patn., reg. finish.....6045@6045@10%

Black Lip or Blue.....6545@6545
Boring Mach. Augers.....7045
Car Bits, 12-in. twist.....4045@10%

Ford's Auger and Car Bits.....4045
Ft. Washington Auger Co., Concord's.....25%

Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.,
No. 10 ext. lip, R. Jennings' list.....25%

No. 20, R. Jennings' list.....4045@10%
Russell Jennings.....25%
L'Hommedieu Car Bits.....15%

Mayhew's Countersink Bits.....45%
Pugh's Black.....35%
Pugh's Jennings' Pattern.....35%

Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%

Snell's King Auger Bits.....60%
Wright's Jennings' Bits.....60%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, 118; large, 536.....5045@10%
Clark's Pattern, No. 1, $\frac{1}{2}$ doz. \$55.
No. 2, 118.....6045@10%

Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat. 252
Lavigne Pat., small size, \$18.00; large size, \$26.00.....6045@10%

Swan's.....60%

Gimlet Bits—

Common Dble. Cut.....\$3.00@3.25
German Pattern, Nos. 1 to 10,
\$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$6.50@7.00
Ames.....2045@10%
Universal.....20%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....4045@10%
Ford's.....33%
C. E. Jennings & Co.,
L'Hommedieu's.....15%

Watrous'.....33%
Snell's.....45%

Awl Hatts—See Handies, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@2.80
Unhanded, Shlided.....gro. \$3.00@3.05
Unhanded, Patent.....gro. \$0.90@1.00

Peg Awls:
Unhanded, Patent.....gro. \$1.31@1.40
Unhanded, Shlided.....gro. \$0.65@0.70

Scratch Awls—

Handled, Com.....gro. \$3.50@4.00
Handled, Socket.....gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$4.75@5.00
Second Quality.....\$4.25@4.50

Double Bit, base weights:
First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle

Axles—Iron or Steel

Concord, Loose Collar.....4545
Concord, Solid Collar.....4545

No. 1 Common, Loose.....3545
No. 14 Com., New Styles.....4545

No. 2 Solid Collar.....3545
Half Patent:

Nos. 7, 8, 11 and 12.....7045
Nos. 13 to 14.....7045

Nos. 15 to 18.....7545
Nos. 19 to 22.....7545

Boxes, Axle—

Common and Concord, not turned lb., 4545

Common and Concord, turned lb., 5545

Half Patent.....lb., 9545@10%

Bait—Fishing—

Hendryx.....20%
B Bait.....25%
Competitor Bait.....2045

Balances—Sash—

Caldwell new list.....50%
Pullman.....5045@10%

Spring—

Spring Balances.....5045@10%

Chatillon's:
Light Spg. Balances.....5045@10%

Straight Balances.....4045@10%
Circular Balances.....5045@10%

Large Dial.....30%
Barb Wire—See Wire, Barb.

Bars—Crow—

Steel Crowbars, 10 to 40 lb. per lb., 2545@36

Towel—

No. 10 Ideal, Nickel Plate..... $\frac{1}{2}$ doz. \$3.50

Beams, Scale—

Scale Beams.....40%
Chatillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered $\frac{1}{2}$ doz. \$0.80;
Tinned.....\$0.85

No. 11 Wire Coppered $\frac{1}{2}$ doz. \$1.15;
Tinned.....\$1.20

No. 10 Wire Tinned..... $\frac{1}{2}$ doz. \$1.50

Western W. G. Co.:
No. 1 Electric..... $\frac{1}{2}$ doz. \$7.80

No. 2 Buffalo..... $\frac{1}{2}$ doz. \$9.00

No. 3 Perfection Dust..... $\frac{1}{2}$ doz. \$9.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd,
\$1.85; No. 6, Jap'd, \$1.65.

Lyon, Jap'd, per doz., No. 2, \$1.35.

Taplin Mfg. Co.:
Improved Dover, per gro., No. 60,
\$4.00; No. 75, \$6.50; No. 100, \$7.00;
No. 102, Tin'd, \$8.50; No. 150,
Hotel, \$15.00; No. 152, Hotel
Tin'd, \$17.00; No. 200, Tumbler,
\$3.50; No. 202, Tumbler Tin'd,
\$9.50; No. 300, Mammoth, per
doz., \$23.00.

Turner & Seymour Mfg. Co.:
T. & S. Dover.....\$4.00
Western W. G. Co., $\frac{1}{2}$ doz., Buffalo,
No. 2, \$8.00; Perfection, No. 3,
\$9.00.

Wonder (R. M. Co.)..... $\frac{1}{2}$ doz. net, \$4.25

Bellows—

Blacksmith, Standard List.....6045@65%
Split Leather.....6045@65%
Grain Leather.....5045@10%

Hand—

Inch. 6 7 8 9 10
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch. 10 12 14 16
Doz. \$7.50 9.00 12.00 15.00

Bells—Cow—

Ordinary Goods.....7545@7545@10%
High grade.....7045@7545
Jersey.....7545@10%
Texas Star.....50%

Door—

Abbe's Gong.....4045@10%
Baron Gong.....50%
Home R. & E. Mfg. Co.'s.....5545@10%
Trip Gong.....5045@10%
Yankee Gong.....4045@50%

Hand—

Polished, Brass.....5045@5045
White Metal.....5045@5045
Nickel Plated.....4045@5045

Swiss.....5045@10%
Cone's Globe Hand Bells.....3345@35%
Silver Chime.....2545@30%

Miscellaneous—

Farm Bells.....lb., 2545@25%
Church and School.....6045@6045%
Table Call Bells.....7045@7045%

Belting—Leather—

Extra Heavy, Short Lap.....6045%
Regular Short Lap.....6045@1045%
Standard.....7045%
Light Standard.....7545%
Cut Leather Lacing.....4045%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).....7545@7545%
Common Standard.....7045@7045%
Standard.....7045@7045%
Extra.....6045@6045%
High Grade.....5045@5045%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire
Upsetters, No. 1, \$1.25; No. 2, \$7.25;
No. 3, \$10.50; No. 4, \$16.25; No. 5,
\$20.50.

Green River Tire Benders and Upsetters.....30%

Bicycle Goods—

John S. Long's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—Tackle—

Common Wooden.....75%
Hartz St. Tackle Blocks.....5045@5045%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipae
Steel, 75%; Hollow Steel, 5045@10%
Star Wire Rope, 50%; Tarbox Metal
Snatch, 50%; Tarbox New Style
Steel, 5045@10%; Wire Rope Snatch,
50%.

Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....5045@10%
See also Machines Hoisting.

Boards, Stove—

Paper and Wood Lined.....40%
Embossed.....50%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....5045

Boils—

Carriage, Machine, &c.—
Common Carriage (cut thread):
% X 6 and smaller 7045@1045%
Larger and Longer 6045@2545%
Phila. Eagle \$3.00 list May 21, '99

Bolt Ends.....6545@6545%
Machines, % x 4 and smaller.....7045@1245%
Machine, larger and longer.....6045@745%

Door and Shutter—

Cast Iron Barrel, Japanned,
Round Brass Knob:
Inch. 3 4 5 6 8
Per doz. \$0.30 .35 .45 .60 .80

Cast Iron Spring Foot, Jap'd,
Inch. 6 8 10
Per doz. \$1.20 1.50 2.25

Cast Iron Chain, Flat, Japanned,
Inch. 8 10
Per doz. \$1.00 1.40 1.65

Cast Iron Flat Shutter, Jap'd.,
Brass Knobs:
Inch. 6 8 10
Per doz. \$0.75 .93 1.25

Wrought Barrel Jap'd. 8045@1045%
Barrel Bronzed.....6045@1045%
Spring.....7045@1045@1045%
Shutter.....5045@5045@1045%
Square Neck.....7045@7545%
Square.....7045@7045%

Ives' Patent Door.....30%
K

Plow and Stove—

Plow.....6545@1045%
Stove.....8545@8545%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '94.....80%
Eagle Phila., list Oct. 16, '94.....8245%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '94.....80%
Eagle Phila., list Oct. 16, '94.....8245%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '94.....80%
Eagle Phila., list Oct. 16, '94.....8245%
Mount Carmel, list Dec. 28, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '94.....80%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16, 1894.....8245%
Upon Nut Co.:
Tire Bolts.....7245%

Borers, Tap—

Borers Tap, Ring, with Handle:
Inch. 1 1 1 1 1 1 1 1 1 1
Per doz. \$1.80 5.60 6.40 8.00

Inch. 2 2 2 2 2 2 2 2 2 2
Per doz. \$5.65 11.50

Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon, New Langdon and Langdon
Impr'd., 2045@10%; Langdon
Acme.....1545@10%
Perfection.....40%
Seavey.....40%
Stanley R. & L. Co., Nos. 240 to 460, 30%; Nos. 50 and 60.....35%

Braces—

Common Ball, American, \$1.25 @ 1.50
Barber's.....5045@1045@10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....60%
C. E. Jennings & Co.....5045
Mayhew's Hatchet.....60%
Mayhew's Quick Action Hay Pat. 5045
Millers Falls Drill Braces.....2545@10%
P. S. & W. Co., Peck's Pat. 6045@5045%
Stanley R. & L. Co., Victor.....45%

Brackets—

Wrought Steel.....7045@1045@10%
Griffin's Pressed Steel 7545@1045@10%
Griffin's Folding Brackets.....7045@10%
Stowell's Cast Shelf, 75%; Sink.....5045
Western W. G. Co., Wire.....6045@10%

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Kilbourne Mfg. Co.....7545@20%
Western W. G. Co.....50%
Wire Goods Co.....7545@1045%

Buckets, Galvanized—

M'fgr's list, price per gross:
Quart. 10 12 14
Water, Reg. 25.35 28.00 32.00
Water, Hvn. 45.35 48.00 52.00
Fire, Rd. Btm. 32.00 34.65 38.65
Well.....37.35 41.35 45.35

Bucks, Saw—

Hoosier..... $\frac{1}{2}$ doz. \$36.00

Bull Rings—See Rings, Bull Butts—

Wrought, High List, Oct. 26, '06,
4545@1545@10%

Cast Iron—

Fast Joint, Broad.....4045@5045%
Fast Joint, Narrow.....4045@5045%
Loose Joint.....7045@1045%
Loose Pin.....7045@1045%
Mayer's Hinges.....7045@7045%
Parliament Butts.....6045@7045%

Wrought Steel—

Reversible and Broad.....7045%
Light Reversible, Light Narrow.....7045%
Loose Joint, Narrow, Light Inside Blind, etc.....7045%
Back Flaps, Table Chest.....65%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 250, 300, 900.....30%

Hendryx Bronze, Series 700, 800, 30%
Hendryx Enamelled, 35%

Calipers—See Compasses.

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4 1/4 @ 4 1/2¢
Sharp, 1 prong, per lb., 4 1/4 @ 5 1/2¢
Burke's Blunt, 4 1/4 @ 4 1/2¢; Sharp, 4 1/4 @ 5 1/2¢
Hautier, Blunt, 4 1/4¢; Sharp, 4 1/4¢
Perkins, Blunt, 1 lb, 3 5/8¢; Sharp, 4 1/8¢

Can Openers—

See Openers, Can.

Cans, Milk—

Illinois Pattern, 5 8 10 gal.
New York Pattern, 1.50 2.20 2.45 each.
Baltimore Pattern, 1.50 2.20 2.45 each.
Indiana, 1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
5 8 10 gal.
\$18.00 60.00 120.00 gro., net.

Caps, Percussion—

Eley's E. B. 58¢/55¢
G. D. per M 34¢/35¢
F. L. per M 40¢/42¢
G. E. per M 40¢/50¢
Musket per M 68¢/69¢

Primers—

Berdan Primers, \$2 per M. 20¢/25¢
Primer Shells and Bullets, 15¢/10¢
All other primers per M. \$1.58 @ 1.60

Cartridges—

Blank Cartridges:
32 G. P., \$5.50 10¢/65¢
32 G. P., \$7.00 10¢/65¢
22 cal. Rim, \$1.50 10¢/65¢
32 cal. Rim, \$2.75 10¢/65¢
B. B. Caps, Con. Ball, Sued. \$1.50
B. B. Caps, Round Ball, \$1.49
Central Fire, 25¢
Target and Sporting Rifle, 15¢/65¢
Primer Shells and Bullets, 15¢/10¢
Rim Fire, Sporting, 50¢
Rim Fire, Military, 15¢/65¢

Casters—

Bed 65¢/10¢
Plate 69¢/65¢
Philadelphia 70¢/10¢
Acme, Ball Bearing, 70¢/10¢
Boss 70¢/10¢
Boss Anti-Friction, 70¢/10¢
Gem (Roller Bearing), 50¢
Martin's Patent (Phoenix), 40¢
Standard Ball Bearing, 45¢
Tucker's Patent low lat., 50¢
Yale (Double Wheel) low lat., 50¢

Cattle Leaders—

See Leaders, Cattle.
Chain, Proof Coil—
American Coil, Straight Link:
5-16 1/4 5-16 3/4 7-16 1/2 9-16
\$3.77 6.17 5.02 4.57 4.37 4.27 4.22
5/8 3/4 1/2 to 1 1/4 to 1 1/2 inch.
\$3.17 4.07 4.02 4.12
In cask lots, deduct 25¢.
German Coil, 60¢/10¢ @ 70¢
Halter—
Halter Chains, 60¢/10¢ @ 70¢
German Pattern Halter Chains,
list July 24, '97, 60¢/10¢ @ 70¢
Covert Mfg. Co., 35¢/65¢
Cow Ties—
See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/2—6 3/4, Straight, with ring, \$28.00
6 1/2—6 3/4, Straight, with ring, \$29.00
6 1/2—8 1/2, Straight, with ring, \$32.00
6 1/2—10 1/2, Straight, with ring, \$37.00
NOTE—Add 2¢ per pair for Hooks.
Trist Traces; add per pair for Nos. 2
and 3, 2¢; No. 1, 3¢; No. 4, 4¢ to price of
Straight Link.
Eastern Standard Traces, Wag-
on Chain, &c., 60¢
Miscellaneous—
Jack Chain, list July 10, '93:
Iron 60¢/10¢
Brass 60¢/10¢
Safety and Plumbers' Chain,
60¢/10¢
Gal. Pump Chain, 10¢/4 1/2¢
Coast Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion 40¢
Oneida Community:
American Halter, Dog and Kennel
Chains 35¢/25¢ @ 40¢
Niagara Dog Leads and Kennel
Chains 45¢/50¢ @ 55¢
Wire Goods Co.:
Dog Chain, 70¢/10¢
Universal Dbl. Jointed Chain, 50¢
Chain and Ribbon, Sash—
Oneida Community:
Steel Chain, 60¢
Pullman:
Bronze Chain, 60%; Steel Chain,
60¢/10¢
Sash Chain Attachments, per set, 3¢
Aluminum Sash Ribbon, per 100
ft., \$1.25 @ \$3.00
Sash Ribbon Attachments, per set, 3¢
Chalk—(From Jobbers.)
Carpenters' Blue, 50¢/55¢
Carpenters' Red, 45¢/50¢
Carpenters' White, 40¢/45¢
Checks, Door—
Rardley's, 45¢
Pullman, per gro., 35¢/40¢
Russwin, 33¢/45¢
Chests, Tool—
American Tool Chest Co.:
Boys' Chests, with Tools, 55¢
Youths' Chests, with Tools, 40¢

Gentlemen's Chests, with Tools, 30%
Farmers', Carpenters', etc., Chests,
with Tools, 27%
Machinists' and Pipe Fitters'
Tool Chests, Empty, 50%
Tool Cabinets, 50%
C. E. Jennings & Co.'s Machinists'
Tool Chests, 33¢/45¢ @ 50%
Chisels—
Socket Framing and Firmer
Standard List, 70¢/10¢ @ 75¢
Buck Bros., 50%
C. E. Jennings & Co.:
Socket Firmer No. 10, 60%
Socket Framing No. 15, 60%
Swan's, 60¢/70¢
L. & I. J. White Co., 30¢/30¢ @ 55¢
Tanged—
Tanged Firmers, 30¢/45¢ @ 55¢
Buck Bros., 50%
C. E. Jennings & Co. Nos. 191, 181, 251,
L. & I. J. White Co., 55¢/55¢
Cold—
Cold Chisels, good quality, 13¢/15¢
Cold Chisels, fair quality, 11¢/18¢
Cold Chisels, ordinary, 9¢/10¢

Chucks—

Almond Drill Chucks, 35%
Almond Turret Six-Tool Chucks, 40%
Beach Pat., each \$8.00, 35¢/50¢
Empire, 35%
Blacksmiths, 25%
Jacobs' Drill Chucks, 35%
Pratt's Positive Drive, 25%
Skinner Patent Chucks:
Independent Lathe Chucks, 40%
Universal, Reversible Jaws, 40%
Combination, Reversible Jaws, 40%
Drill Chucks, New Model, 25%;
Standard, 40¢/10¢; Skinner Pat.,
25%; Positive Drive, 40%
Planer Chucks, 30%
Face Plate Jaws, 40%
Standard Tool Co., 40%
Improved Drill Chuck, 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21, 35%
Scroll Combination, Nos. 82 and
30, 35%
Geared Scroll, Nos. 33, 34 and 35, 30%
Independent Iron, Nos. 18 and 318, 30%
Independent Steel, No. 61, 25%
Union Drill, Nos. 000, 00, 100, 101,
102, 103, 104, 35%
Union Clear Drill, 35%
Universal 11, 12, 16, 17, 13, 14, 15, 35%
Universal, No. 42, 30%
Iron Face Plate Jaws, Nos. 28, 30,
48 and 50, 35%
Steel Face Plate Jaws, Nos. 70 and
72, 30%
Westcott Patent Chucks:
Lathe Chucks, 50%
Little Giant Auxiliary Drill, 50%
Little Giant Double Grip Drill, 50%
Little Giant Drill, Improved, 50%
Oneida Drill, 50%
Scroll Combination Lathe, 50%

Clamps—

Adjustable Hammers, 20¢/20¢ @ 55¢
Carriage Makers', P., S. & W.
Co., 40¢/10¢ @ 50¢
Resly, Parallel, 33¢/45¢
Myers' Hay Rack, 45%
Lineman's, Utica Drop Forge & Tool
Co., 40%
Wood Workers, Hammers, 40¢/10¢
Saw Clamps, see Vices, Saw Filers.
Cleaners, Drain—
Iwan's Champion, Adjustable, 35%
Iwan's Champion, Stationary, 45%
Sidewalk—
Star Socket, All Steel, 40 doz. \$4.05 net
Star Shank, All Steel, 40 doz. \$3.24 net
W. & C. Shank, All Steel, 40 doz.,
7 1/2 in., \$3.00; 8 in., \$3.25.
Cleavers, Butchers'—
Foster Bros., 30%
Fayette R. Plumb, 30%
L. & I. J. White Co., 30%
Clippers, Horse and Sheep—
Chicago Flexible Shaft Company:
1902 Chicago Horse, each, \$10.75
20th Century Horse, each, \$5.00
Lightning Belt Horse, each, \$15.00
Chicago Belt Horse, each, \$20.00
Stewart's Enclosed Gear
Horse, each, \$6.75
Stewart's Patent Sheep Shear-
ing Machine, each, \$12.75
Stewart Enclosed Gear Shear-
ing Machine, No. 8, each, \$9.75
Clips, Axle—
Regular Styles, list July 1, '05,
80¢/80¢ @ 10¢
Cloth and Netting, Wire—
See Wire, &c.
Cocks, Brass—
Hardware Hat:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c., 60¢/10¢ @ 65¢
Compression Bibbs, 55¢/10¢ @ 60¢
Coffee Mills—
See Mills, Coffee.
Collars, Dog—
Nickel Chain, Walter B. Stevens &
Son's list, 40%
Lather, Walter B. Stevens & Son's
list, 40%
Combs, Curry—
Metal Stamping Co., 40%
Compasses, Dividers, &c.—
Ordinary Goods, 70¢/10¢ @ 75¢
Wm. Schollhorn Co.:
Excelsior Dividers, 55%
Lodi Dividers, 75%
Conductor Pipe—
L. C. L. to Dealers:
Galv. Charcoal Copper,
Steel, Iron, 1 1/2, 1 3/4, 2 1/2 oz.
Eastern: 70% 50¢/77 1/2% 30%

Central:
65¢/10% 55¢/2 1/4% 30¢/10%
Western and Southern:
65¢/5% 50¢/7 1/2% 20¢/7 1/2%
So. Western
50¢/25¢ @ 2 1/2% 50% 20¢/5%
Terms, 60 days; 2% cash 10 days. Fac-
tory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each, 2 3 4 6 8
Labrador, \$1.20 \$1.50 \$1.80 \$2.10 \$2.70
Gal., 3 4 6 8
Iceland, ea. \$1.80 \$2.10 \$2.40 \$3.00
Gal., 3 4 6 8
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.90 \$3.90
Galvanized, Lined, side handles,
Gal., 2 3 4 6 8
Each, \$1.95 \$2.15 \$2.40 \$3.30 \$4.15
White Enamelled, 25%; Agate Lined, 25%

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair
and heavier, 32¢/35¢; lighter
than 3 lb. to pair, 34¢/37¢

Cord—Sash—

Braided, Drab, 1b. 35¢
Braided, White, Com., Nos. 8
to 12, 26¢; No. 7, 26 1/2¢; No. 6,
27 1/2¢.
Cable Laid Italian, lb., No. 18, 37¢
Italian, lb., A. No. 18, 25¢; B, 25¢
Common India, lb., 11¢/11 1/2¢
Cotton Sash Cord, Twisted, 18¢/20¢
Patent Russia, lb., 80¢
Cable Laid Russia, lb., 21¢
India Hemp, Br'd'd., lb., 21¢
India Hemp, Twisted, lb. 13¢/15¢
Patent India, Twisted, lb., 47¢
Aniston Cordage Co.: 1b. solid
Braided, Nos. 8 to 12, \$0.24; No. 7,
\$0.24 1/2; No. 6, \$0.25 1/2; 1/2 doz., 50 ft.,
Oriole, \$2.00; 50 ft., Columbia, \$0.85;
50 ft., Victors, \$1.00; 50 ft., 6-Thread,
\$1.00; 50 ft., 8-Thread, \$0.85; 50 ft.,
Manila, \$1.40; 60 ft., Jute, \$0.75.
Pearl Braided, cotton, No. 6, 1/2 lb.,
27 1/2¢; No. 7, 26 1/2¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12,
26¢; 7, 26 1/2¢; 6, 27 1/2¢.
Harmony Cable Laid Italian, Nos. 7
to 10, 1b 23¢
Fullman:
Wire Sash Cord, 10%
Sash Cord Attachments, per doz. 10¢
Samson, Nos. 8 to 12:
Braided, 1/2 lb., Drab Cotton,
55¢; Italian Hemp, 40¢ @
50¢; Linen, 65¢; White Cot., \$1.00;
ton, 50¢; Spot Cord, 50¢
Massachusetts, White, 1b 40¢
Massachusetts, Drab, 1b 45¢
Phoenix, White, Nos. 8 to 12, 27¢
Silver Lake, per lb.:
A. B. 45¢; A. White, 40¢;
B. Drab, 40¢; B. White, 35¢;
Italian Hemp, 40¢; Linen, 57 1/2¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906, 85¢/10¢ @ 85¢/10¢ @ 10%
Hendryx Standard Wire Picture Com-
old list, 85¢/10%
Turner & Stanton Co. Wire Picture
Cord, 90%

Cradles—

Grain 40¢/12 1/2%

Crayons—

White Round Crayons, Cases, 100
gro., \$6.50 @ \$7.50 at factory, but
lower prices made by jobbers.
Zelmer's Lumber, 30 gro.
White and Purple, Indelible, \$7.50
Blue, Red, Green, Yellow and
Terra Cotta, \$6.50; Black, \$1.00
Giant Lumber, 5 1/4 in. x 15-16 in.
round, all colors, \$16.25; Indeli-
bles, \$18.75
Genuine Soapstone, Metal Workers',
5 in. x 1 1/4 in. Round, \$2.50; 5 in. x
1 1/4 in. Square, \$1.75; 5 x 1 1/2 x 3-16,
\$2.50; 5 x 1 1/4 x 3-16, \$3.00
Crooks, Shepherds'—
Fort Madison, per doz., Heavy, \$7.00;
Light, \$6.50
Crow Bars—See Bars, Crow.

Cultivators—

Victor Garden, 50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1817, 30 doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor, 30 doz. \$3.00
Wm. Rogers & Son, 30 doz. \$2.50
Cutters—Glass—
H. H. Mayhew Co., 40%
Red Devil, 50%
Smith & Hemenway Co., 50%
Woodward, 40%
Meat and Food—
American, 30%
Nos., 401 402 403 404 405 406 407
Each, \$5 \$7 \$10 \$12 \$25 \$50 \$60
Enterprise:
Nos., 10 12 22 32
Each, \$2 \$3 \$2.75 \$1.50 \$6 25¢ @ 7 1/4¢
No. 202, \$1.50, 40¢/7 1/4¢
Dixon's, 30 doz. 30¢/30¢ @ 5%
Nos., 1 2 3
Ideal, \$14.00 \$17.00 \$19.00 \$20.00
Little Giant, 40¢/40¢ @ 5%
Nos., 305 310 312 320 322
Each, \$35.00 \$48.00 \$44.00 \$72.00 \$68.00
N. E. Food Choppers, 25%
New Triumph No. 605, 30 doz. \$24.00,
10850%
Russwin Food, No. 1, \$24.00; No. 2,
\$27.00, 45¢/10¢ @ 10%
Woodruff's, 30 doz. 30¢/30¢ @ 5%
Nos., 100 150
Each, \$15.00 \$18.00
Enterprise Beef Shavers, 25¢/30%

Slaw and Kraut—

Henry Huston & Sons:
Slaw and Kraut Cutters, 35%
Corn Graters, 30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife, 30 doz. \$3.00
Combined Slaw Cutter and Corn
Grater, 1 Knife, 30 doz. \$4.00
Tucker & Dorney Mfg. Co.:
Kraut Cutters, 40%
Slaw Cutters, 1 Knife, 30 gr. \$18 @ \$20
Slaw Cutters, 2 Knife, 30 gr. \$22 @ \$35

Tobacco—

All Iron, Cheap, doz. \$4.25 @ \$4.50
Euterprae, 30 doz., \$34.00, 25%
National, 30 doz., No. 1, \$21; No. 2,
\$18, 40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, 30 doz., \$24.00, 25%
Samson, 30 doz., \$34.00, 25%
Iwan's Improved Post Hole Auger, 100's,
Vaughan Pattern Post Hole Augers,
30 doz., \$6.25
Perfection Post Hole Diggers, 30 doz.,
\$8.75
Split Handle Post Hole Diggers, 30 doz.,
\$7.75
Kohler's, 30 doz., Universal, \$14.00;
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.00; Pioneer, \$7.00
Never-Break Post Hole Diggers, 30
doz., \$24.00, 60%

Dividers—See Compasses.

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, 30
doz., \$18; No. 2, \$15; No. 3, \$12;
No. 4, \$18.

Drawing Knives—

See Knives, Drawing.

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers, 35%
Sterling Wheel Dresser Cutters, 35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling
Machines, \$1.50 @ \$1.75
Breast, Millers Falls, 100 lb.
Breast, P. S. & W., 40%
Goodell Automatic Drills, 50¢/10¢ @ 60¢/10%
Johnson's Automatic Drills, Nos. 2
and 3, 16%
Johnson's Drill Points, 15%
Millers Falls Automatic Drills, 33¢/10¢
Hatchet, Curtis & Curtis, 25%
Hatchet, Parker's, 40%
Hatchet, Weston's, 40%
Hatchet, Weston's, Style II im-
proved, 40%
Hatchet, No. 012, 40%
Hatchet, Celebrated, 40%
Hatchet, Whitney's, P. S. & W., 50%
Whitney's, No. 1, \$10.00;
Adjustable, No. 10, \$12.00, 33 1/2%

Twist Drills—

Bit Stock, 60¢/10¢ @ 70%
Taper and Straight Shank,
60¢/10¢ @ 60¢/10¢ @ 55%

Drivers, Screw—

Screw Driver Bits, per doz. 45¢/50¢
Balsey's Screw Holder and Driver, 30
doz., 2 1/2 in., \$0; 4 in., \$7.50; 6 in.,
\$9.00, 50%
Buck Bros.' Screw Driver Bits, 30%
Champion, 50%
Disston's, 70%
Eray's, 60%
Fray's Hol. H'dle Set, No. 3, \$12.50;
Ford's Brace Screw Drivers, 40¢/10¢
Gay's Double Action Hatchet, 35%
Goodell's Auto, 65¢/65¢ @ 10%
Mayhew's Black Handle, 40%
Mayhew's Monarch, 40%
Millers Falls, Nos. 20 and 21, 25¢/10¢
Millers Falls, Nos. 11, 12, 14, 12-15¢/10¢
New England Specialty Co., 30%
Smith & Hemenway Co., Never-
turn, 40¢/5%
H. D. Smith & Co.'s Perfect H'dle, 40%
Stanley R. & L. Co.:
No. 64, Varn. Handles, 60¢/10¢; No.
86, 70%; Defiance, 70%; Hurwood,
55%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540,
40¢/10%

Eave Trough, Galvanized—

Territory, L. C. L. Galvanized
Galv. Charcoal Copper,
Steel, Iron, 1 1/2, 1 3/4, 2 1/2 oz.

Eastern:—

70¢/30% 70% 30%
Central:
75¢/10¢ @ 2 1/4% 65¢/10% 20¢/10%
Western and Southern:
76¢/7 1/2% 65% 20¢/7 1/2%
So. Western:
75% 60¢/10% 20¢/5%
Terms, 25% for cash. Factory ship-
ments generally delivered.
See also Conductor Pipe and Elbows
Elbows and Shoes—
Factory ship vents, all territories:
Galv. Steel and Galv. C. I.
Standard Gauge, 80%
No. 26, 50%
No. 24, 25%
No. 22, 10%
Copper, 40¢/10%
Elbows, Stove Pipe—
Edwards, Standard Blue, 40¢/10¢ @ 10%
Edwards, Royal Blue, 40¢/10¢ @ 10%
Dover, one piece (R. M. Co.), 40¢/10%
Perfect Elbows, 40%
Emery, Turkish—
4 to 5 1/2 to
46: 220: Flour:
Kege, 1b. 5¢ 5 1/4¢ 5 1/2¢
1 1/4 Kege, 1b. 5 1/4¢ 5 1/4¢ 5 1/4¢
1 1/2 Kege, 1b. 5 1/4¢ 5 1/4¢ 5 1/4¢
10-lb. cans, 7¢ 6¢ 6¢
10 in case, 6 1/4¢ 7¢ 6¢
10-lb. cans, less
than 10, 10¢ 10¢ 10¢
Less quantity, 10¢ 10¢ 10¢
NOTE—In lots 1 to 3 tons a discount
of 10% is given.

Extractors, Lemon Juice

—See Squeezers, Lemon.

Fasteners, Blind—Zimmerman's 50¢10¢
Walling's 40¢10¢**Cord and Weight—**

Ives 33%

Faucets—Cork Lined 50¢50¢10¢
Metallic Key, Leather Lined 60¢10¢70¢Red Cedar 40¢10¢50¢
Petroleum 70¢10¢75¢H. & L. B. Co.:
Metal Key 60¢10¢Star 60¢
West Lock 50¢10¢John Sommer's Peerless Tin Key 40¢
John Sommer's Boss Tin Key 50¢John Sommer's Victor Mtl. Key 50¢10¢
John Sommer's Duplex Metal Key 40¢John Sommer's Diamond Lock 40¢
John Sommer's I.X.L. Cork Lined 50¢

John Sommer's Reliable Cork Lined 50¢10¢

John Sommer's Chicago Cork Lined 60¢
John Sommer's O. K. Cork Lined 50¢John Sommer's No Brand Cedar 40¢
John Sommer's Perfection Cedar 50¢McKenna, Brass:
Burglar Proof, N. P. 25¢Improved, 1/2 and 1 inch 25¢
Self Measuring 40¢10¢Enterprise, 1/2 doz. \$36.00 40¢10¢
Lane's, 1/2 doz. \$36.00 40¢10¢

National Measuring, 1/2 doz. \$36.00 40¢10¢

Felloe Plates—

—See Plates, Felloe.

Files— Domestic—

List Nov. 1, 1899.

Best Brands 70¢10¢75¢10¢

Standard Brands 75¢10¢75¢10¢

Lower Grade 75¢10¢10¢80¢10¢

Imported—

Stubbs' Tapers, Stubbs' list, July 21, '97 85 1-3 40¢

Fixtures, Fire Door—Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 43.75Fusible Links, No. 96 50¢
Expansion Bolts, No. 107 60¢10¢**Grindstone—**Net Prices:
Inch 15 17 19 21

Per doz. \$3.25 3.75 4.25 4.75

P. S. & W. Co. 30¢10¢

Reading Hardware Co. 60¢

Stowell's Giant Grindstone 40¢

Stowell's Grindstone Fixtures, Extra Heavy, 40¢10¢; Light 50¢

Fodder Squeezers—

—See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato 60¢10¢

Victor, Hay 60¢15¢24¢

Victor, Manure 60¢

Victor, Header 60¢

Champion, Hay 60¢

Champion, Header 60¢

Champion, Manure 60¢15¢24¢

Columbia, Hay 60¢20¢

Columbia, Manure 70¢

Columbia, Spading 70¢12¢

Hawkeye Wood Barley 40¢

W. & C. Potato Digger 60¢10¢

Acme Hay 60¢20¢

Acme Manure, 4 tine 60¢10¢5¢

Dakota Header 60¢20¢

Jackson Steel Barley 60¢20¢

Kansas Header 60¢

W. & C. Favorite Wood Barley 40¢

Plated—See Spoons.

Frames— Wood Saw—

White, 8'g't Bar, per doz. 75¢80¢

Red, 8'g't Bar, per doz. \$1.00\$1.15

Red, Dbl. Brace, per doz. \$1.40\$1.50

Freezers, Ice Cream—

Qt. 1 2 3 4 6

Each \$1.30 \$1.60 \$1.90 \$2.20 \$2.60

Fruit and Jelly Presses—

—See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse— Per 1000 Feet.**

Hemp \$2.75

Cotton 3.20

Waterproof Spl. Taped. 3.63

Waterproof Dbl. Taped. 4.40

Waterproof Tpl. Taped. 5.15

Gates, Molasses and Oil—

Stebbins' Pattern 60¢10¢

Gauges—

Marking, Mortise, &c. 50¢50¢10¢

Chapin-Stephens Co.:
Marking, Mortise, &c. 50¢50¢10¢

Disston's Marking, Mortise, &c. 67%

Stanley R. & L. Co.'s Butt and Rabbit Gauge 30¢

Marking and Mortise 35¢

Wire, Brown & Sharpe's 35¢

Wire, Morse's 25¢

Wire, P. S. & W. Co. 30¢

Glimets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30

Nail, Metal, No. 1, \$4.00; 2, \$4.30

Nail, Wood Handled, No. 1, \$2.50; 2, \$2.80

Spike, Wood Handled, No. 1, \$4.50; 2, \$4.80

Glass, American Window

—See Trade Report.

Glasses, Level—

Chapin-Stephens Co. 65¢65¢10¢

Glue, Liquid Fish—

Bottles or Cans, with Brush 25¢10¢50¢

International Glue Co. (Martin's) 40¢

Grease, Axle—

Common Grade gro. \$4.50\$6.00

Dixon's Everlasting, 10-lb. pails, ea. \$5; in boxes, 1/2 doz., 1 lb., \$1.20;

2 lb. \$2.00

Helmet Hard Oil 25¢

Griddles, Soapstone—

Pike Mfg. Co. 33%\$33%\$10%

Grindstones—Pike Mfg. Co.:
Improved Family Grindstones, 1/2 inch, 1/2 doz., \$2.00 33%Royal Mfg. Co.:
Alumund Grinding Machines, each, Nos. 01, \$1.75; 1A, \$2.50; 10, \$5.00

Alumund Sickle Grinders, each, Nos. 20A, \$6.00; 20A Combined, \$6.50

Alumund Disc Grinders, each, \$2.50 30%

Grips, Nipple—

Perfect Nipple Grips 40¢10¢2%

Halters and Ties—

Cow Ties 40¢5¢\$60¢10%

Covert Mfg. Co.:
Web 30¢2%

Jute Rope 35¢

Sisal Rope 20¢

Cotton Rope 45¢

Hemp Rope 45¢

Oneida Community:
Am. Coil and Halters 40¢40¢5¢

Am. Cow Ties 45¢50¢

Niagara Coil and Halters 45¢50¢5¢

Niagara Cow Ties 45¢50¢5¢10¢5¢

Hammers—**Handled Hammers—**

Heller's Machinists' 55¢10¢55¢10¢5¢

Heller's Farriers' 40¢50¢40¢10¢5¢

Magnetic Tack, Nos. 1, 2, 3, 4, 5, \$1.50, \$1.75, \$2.00, \$2.25, \$2.50

Peck, Stow & Wilcox, Steel 50¢

Fayette R. Plumb:
A. E. Nail 40¢24¢40¢12%

Eng. and B. S. Hand 50¢12¢60¢

Machinists' Hammers 50¢150¢60¢

Rivet and Timmers' 40¢24¢40¢12%

Vaughan & Bushnell Mfg. Co.:
A. E. Nail 40¢24¢40¢12%

Machinists' 50¢150¢60¢5¢

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢, 90¢5¢10¢

3 to 5 lb., per lb., 40¢, 80¢5¢10¢

Over 5 lb., per lb., 30¢ 80¢10¢5¢10¢

Wilkinson's Smiths' lb. 9%\$10¢

Handles—**Agricultural Tool Handles**

A.C. Pick, &c. 60¢10¢60¢10¢5¢

Hoe, Rake, &c. 40¢45¢5¢

Fork, Shovel, Spade, &c.:
Long Handles 40¢45¢5¢

D Handles 40¢

Cross-Cut Saw Handles—

Alkins' 40¢

Champion 50¢

Disston's 50¢

Mechanics' Tool Handles—

Auger, assorted gro. \$2.50\$3.00

Brad Axl. gro. \$1.65\$1.75

Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, \$2.40\$2.65; Hickory \$2.15\$2.40

Socket Firming, Apple, \$1.75\$1.95; Hickory \$1.45\$1.60

Socket Framing, Hickory, \$1.60\$1.75

File, assorted gro. \$1.30\$1.40

Hammer, Hatchet, &c. 60¢10¢60¢10¢5¢

Hand Saw, Varnished, doz. 80¢85¢; Not Varnished 65¢75¢

Plane Handles:

Jack, doz. 50¢; Jack, Bolted 75¢

Fore, doz. 45¢; Fore, Bolted 95¢

Chapin-Stephens Co.:
Carriving Tool 40¢40¢10¢

Chisel 65¢65¢10¢

File and Awl 65¢65¢10¢

Saw and Plane 40¢40¢10¢

Screw Driver 40¢40¢10¢

Miller's Falls Adj. and Ratchet Auger Handles 20¢40¢

Nicholson Simplicity Pile Handle 1/2 gro. \$0.85\$1.50

W. A. Zelnicker Supply Co.:
Hammer, per doz., 12 in., \$2.00; 14 in., \$2.00; 16 in., \$2.30; 18 in., \$2.50; 20 in., \$2.70; 22 in., \$3.00; 24 in., \$3.30; 26 in., \$3.50; 30 in., \$3.80

Sledge, per doz., oval 30 in., \$3.80; octagon, 30 in., \$3.80; oval 36 in., \$4.00; octagon, 36 in., \$4.00

Axe, per doz., 28 to 34 in., \$5.60; 36 in., \$5.80

Adze, per doz., 36 in., \$5.80; 36 in., \$7.80

Pick, per doz., R. R., 36 in., \$8.00; coal, 34 in., \$5.80

Hatchet, per doz., 12 to 14 in., \$2.00

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Albion Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 90%**Chicago Spring Butt Co.: 25%**

Oscillating 25%

Big Twin 25%

Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%

Elevator 30%

Railroad 50%

Cronk & Carrier Mfg. Co.:
Loose Axle 60¢10%

Roller Bearing 70%

Griffin Mfg. Co.:
Solid Axle, No. 10, \$12.00 70%

Roller Bearing, No. 11, \$15.00, 70%

Roller Bearing, Ex. Hy., No. 22, \$18.00 70%

Hinged Hangers, \$18.00 60¢10%

Lane Bros. Co.:
Parlor, Ball Bearing, \$1.00; Standard, \$3.15; No. 105, \$2.85; New Model, \$2.80; New Cham- pion \$2.25

Bion 60¢5¢

Hinged net \$6.08

Covered 60¢2%

Special 70¢5¢

Lawrence Bros.:
Cleveland and Peerless 60¢24¢

Clipper, No. 75 60¢5¢

Crown 60¢24¢

Cyclone-Tandem net \$7.50

Easy Parlor Door, Dbl. Sets, \$2.50; Single Sets, \$1.25 60%

Giant 60%

Hummer 70¢7%

New Cyclone, Flexible, \$16.00, 60¢24¢

New York 60¢24¢

McKinney Mfg. Co.:
No. 1 Special, \$15 60¢10%

No. 2 Standard, \$18 60¢10%

Hinged Hanger, \$16 50%

Meyers' Ayon Hangers 60%

Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60¢5¢

Pioneer Wood Track, No. 3, \$2.25

Roller B'r'g St'l Track No. 12, \$2.20

Roller B'r'g St'l Track No. 13, \$2.50

Roller B'r'g, Nos. 39, 41, 43, 70¢7%

Hero, Adj. Track No. 19, 50¢10%

Adjustable Track Tandem Trolley Track No. 16 50¢10%

Seal, Steel Track No. 8 \$2.25

Auto Adj. Track No. 22 50¢5¢

Trolley B. D. No. 17, \$1.25; F. D. No. 120, \$2.25; No. 121, \$2.45; No. 150, \$2.50

Safety Underwriters F. D. No. 101 50%

Tandem No. 41, 24 and 3 60¢10%

Palace, Adjustable Track No. 132 50¢5¢

Royal, Adjustable Track No. 122 50¢10%

Ives Wood Track No. 1 \$2.25

Trolley B. D. No. 20, 50¢10%

Trolley B. D. No. 24, \$1.30; No. 27, \$1.40; No. 28 \$1.60

Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢7%

Anti-friction, No. 42, No. 44, 25 and 3 60%

Hinged Tandem No. 3 60%

Folding Door B. B. Swivel No. 135 40%

Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing 30%

Acme Hinge Door 60%

Apex Parlor Door 50¢10%

Atlas 60%

Baggage Car Door 50%

Elevator 40%

Express 50%

Lundy Parlor Door 60%

Matchless 60%

Nansen 70%

Parlor Door, 50¢10%; Railroad, 50¢10%

Steel, Nos. 300, 404, 500 50%

Underwriters' Fire Door 40%

Wild West Warehouse Door 50%

Wilburn, No. 0, net, 1/2 doz. \$9.00

Zenith for Wood Track 50%

A. L. Sweet Iron Works:
Check Back, 70%; Eagle 70%

Climax Anti-Friction 50¢10%

Eagle Hinge, New Perfection Pilot, Pilot Door 50%

Rider Wooster 65%

Western Pattern 70%

Pins, Escutcheon—
 Brass 50¢ @ 50¢ & 10¢
 Iron, list Nov. 11, '85 60¢ @ 60¢ & 10¢
Pipe, Cast Iron Soil—
 Carload lots.
 Standard, 2-6 in. 50¢ @ 10¢ & 10¢ & 5¢
 Extra Heavy, 2-6 in. 65¢ @ 10¢
 Fittings 70¢ @ 10¢ & 10¢ & 5¢

Pipe, Merchant—
 Consumers, Carloads.
 Steel. Iron.
 Blk. Gale. Blk. Gale.
 1/4 & 1/2 in. 65¢ 57¢ 41¢
 3/4 in. 66¢ 58¢ 41¢
 1 in. 68¢ 59¢ 41¢
 1 1/4 to 2 in. 72¢ 62¢ 46¢
 2 to 12 in. 69¢ 54¢ 46¢

Pipe, Vitrified Sewer—
 Carload lots.
 Standard Pipe and Fittings, 3
 to 24 in., f.o.b. factory:
 First-class 84¢
 Second-class 87¢
 NOTE.—Market irregular.

Pipe, Stove—
 Per 100 joints.
 Edwards' Nested: C. L. L. C. L.
 5 in., Standard Blue 75¢ 75¢
 6 in., Standard Blue 75¢ 75¢
 7 in., Standard Blue 75¢ 75¢
 5 in., Royal Blue 75¢ 80¢
 6 in., Royal Blue 75¢ 80¢
 7 in., Royal Blue 75¢ 80¢
 Wheeling Corrugated Co.'s Nested:
 5 in., Uniform Color 75¢ 75¢
 6 in., Uniform Color 75¢ 75¢
 7 in., Uniform Color 75¢ 75¢

Planes and Plane Irons—
 Wood Planes—
 Bench, first qual. 30¢ @ 30¢ & 10¢
 Bench, second qual. 40¢ @ 40¢ & 10¢
 Molding 25¢ @ 25¢ & 10¢
 Bailey's (Stanley R. & L. Co.) 35¢ & 2¢
 Chapin-Stephens Co.:
 Bench, First Quality 30¢
 Bench, Second Quality 40¢
 Molding and Miscellaneous 25¢
 Toy and German 30¢
 Union 60¢

Iron Planes—
 Bailey's (Stanley R. & L. Co.) 35¢
 Chapin's Iron Planes 30¢ & 10¢
 Miscellaneous Planes (Stanley R. & L. Co.) 30¢ & 5¢
 Union 60¢

Plane Irons—
 Wood Bench Plane Irons, list
 Dec. 12, '06 25¢
 Buck Bros. 30¢
 Chapin-Stephens Co. 25¢
 Stanley R. & L. Co. 30¢
 L. B. L. J. White 20¢ & 25¢
 Union 60¢

Planters, Corn, Hand—
 Kohler's Eclipse 50¢ doz. \$2.00
Plates—
 Felloe 1 lb. 4¢ @ 1/4¢
 Self-Sealing Plates (H. M. Co.)
 1/2 doz. \$2.00 50¢

Pliers and Nippers—
 Button Pliers 75¢ @ 75¢ & 10¢
 Gas Burner, per doz. 5 in., \$1.25
 @ \$1.30; 6 in., \$1.45 @ \$1.50.
 Gas Pipe, 7 8 10 12 in.
 \$2.00 \$2.25 \$2.75 \$3.50
 Acme Nippers 50¢ & 5¢
 Cronk & Carrier Mfg. Co.:
 American Button 80¢
 Improved Button 75¢ & 10¢
 Cronk's 50¢
 No. 80 Linemen's 45¢
 Stub's Pattern 45¢
 Combination and others 33¢
 Heller's Farmers' Nippers, Pincers
 and Tools 40¢ & 50¢ @ 10¢ & 5¢
 The Nettleton Mfg. Co. Reversible
 Cutting Nippers 40¢
 P. S. & W. Tinner's Cutting Nip-
 pers 40¢
 Wm. Schollhorn Co.:
 Bernard, 33 1/4%; Elm City, 33 1/4%;
 Paragon, 50%; Lodi, 50%.
 Swedish Side, End and Diagonal Cut-
 ting Pliers 50¢
 Utica Drop Fore & Tool Co.:
 Pliers and Nippers, all kinds 40¢
 Vaughan & Bushnell Mfg. Co.:
 Gas Burner, per doz. 5 in., \$2.50;
 6 in., \$3.00.
 Gas, per doz. 7 in., \$3.50; 8 in.,
 \$3.75; 10 in., \$4.50.
 Nippers, Horsehoes' Cutting, 40%;
 Hoof Paring 40%

Plumbs and Levels—
 Chapin-Stephens Co.:
 Plumbs and Levels 30¢ @ 30¢ & 10¢
 Chapin's Imp. Brass Cor. 40¢ @ 40¢ & 10¢
 Pocket Levels 30¢ @ 30¢ & 10¢
 Extension Sights 40¢ @ 40¢ & 10¢
 Machinists' 40¢ @ 40¢ & 10¢
 Diston's Plumbs and Levels 60¢ @ 10¢
 C. E. Jennings & Co.'s Iron, Adjust-
 able 60¢ & 10¢
 Stanley R. & L. Co. 40¢
 Stanley's Drop Fore & Tool Co. 40¢
 Woods' Extension 33 1/4%

Poachers, Egg—
 Buffalo Steam Egg Poachers, 50¢ doz.
 No. 1, \$6.00; No. 2, \$9.00; No. 3,
 \$9.00; No. 4, \$12.00 50¢
Points, Glaziers—
 Bulk and 1-lb. papers 1 lb. 10¢
 1/4-lb. papers 1 lb. 9¢ @ 10¢
 1/2-lb. papers 1 lb. 8¢ @ 10¢

Pokes, Animal—
 Ft. Madison Hawkeyes 50¢ doz. \$3.25
 Ft. Madison Western 50¢ doz. \$4.00
Police Goods—
 Manufacturers' Lists 50¢ @ 50¢ & 10¢
 Tower's 25¢

Polish—Metal, Etc—
 Glashite, No. 2, 5 lb. can (powder),
 each, \$1.25; 50¢ doz. \$12.00; No. 3, 10 lb.
 can (cake), each, \$2.50; 50¢ doz. \$24.00.
 Prestoline Liquid, No. 1 (1/4 pt.),
 50¢ doz. \$3.00; No. 2 (1 qt.), 95¢ doz. 40¢

Prestoline Paste 40¢
 George William Hermann 50¢
 U. S. Metal Polish Paste, 3 oz.
 boxes, 50¢ doz. 50¢; 50¢ doz. 50¢;
 1 lb. boxes, 50¢ doz. 50¢; 1 lb.
 boxes, 50¢ doz. 50¢.
 U. S. Liquid, 8 oz. cans, 50¢ doz.,
 \$1.25.
 Barkeepers' Friend Metal Polish,
 50¢ doz., \$1.75.

Stove—
 Black Eagle Benzine Paste, 5 lb. cans,
 50¢ doz. 50¢
 Black Eagle, Liquid, 1/4 pt. cans,
 50¢ doz. 50¢
 Black Jack Paste, 5 lb. cans, 50¢ doz. 50¢
 Black Kid Paste, 5 lb. cans, 50¢ doz. 50¢
 Ladd's Black Beauty Liquid, per
 100 tins 50¢
 Joseph Dixon's, 50¢ gr. \$5.75 10¢
 Dixon's Plumbago 10¢
 Firebrand 10¢
 Gem, 50¢ gr. \$4.50 10¢
 Japanese 10¢
 Jet Black 10¢
 Peerless Iron Enamel, 10 oz. cans,
 50¢ doz. \$1.50

Wynn's Black Silk:
 Paste, cans, 50¢ doz., 5 oz., \$0.75;
 1 lb. \$1.00; 1 lb. \$1.00 50¢
 Paste, 5 lb. cans 50¢
 Liquid, cans, 50¢ doz., 6 oz., \$0.75;
 1/2 pt., \$1.00; 1 pt., \$1.75
 Steel Range Enamel, 50¢ doz., 1/4 pt.,
 \$1.00; 1/2 pt., \$1.25.

Poppers, Corn—
 1 qt. Square, doz. \$0.80; gro. \$8.00
 1 qt. Round, doz. \$0.90; gro. \$9.00
 1 1/2 qt. Square, doz. \$1.00; gro. \$10.00
 2 qt. Square, doz. \$1.20; gro. \$12.00

**Post Hole and Tree Au-
 gers and Diggers—**
 See also Diggers, Post Hole, &c.

Posts, Steel—
 Steel Fence Posts, each, 5 ft., 42¢;
 6 ft., 46¢; 6 1/2 ft., 48¢.
 Steel Hitching Posts each \$1.30

Potato Parers—
 See Parers, Potato.

Pots, Glue—
 Enamelled 35¢ @ 10¢
 Tinned 30¢ @ 10¢

Powder—
 In Containers:
 Duck, 1 lb. each 45¢
 Fine Sporting, 1 lb. each 75¢
 Rifle, 1/2 lb. each 12¢
 Rifle, 1 lb. each 25¢

In Keys—
 12 1/2-lb. keys \$3.50
 25-lb. keys \$4.50
 King's Semi-Smokeless:
 Keg (25 lb. bulk) \$6.50
 Half Keg (12 1/2 lb. bulk) \$3.50
 Quarter Keg (6 1/4 lb. bulk) \$1.90
 Case 24 (1 lb. cans bulk), 14.00, 17.00
 Half case (1 lb. cans bulk) \$4.50
 King's Smokeless: Shot Gun Rifle,
 Keg (25 lb. bulk) \$12.00 \$15.00
 Half Keg (12 1/2 lb. bulk) 6.25 7.00
 Quarter Keg (6 1/4 lb. bulk) 3.25 4.00
 Case 24 (1 lb. cans bulk), 14.00, 17.00
 Half case 12 (1 lb. c. bk.), 7.25, 8.75
 Robin Hood 500 Shot Gun, 50¢ doz. 50¢

Presses—
 Fruit and Jelly 20¢ @ 25¢
 Enterprise Mfg. Co. 20¢ @ 25¢
Seal Presses—
 Morrill's No. 1, 50¢ doz. \$20.00 50¢
Pruning Hooks and Shears
 See Shears.

Pullers, Nail—
 Cyclops 50¢
 Miller's Falls, No. 3, 50¢ doz. \$12.00
 Morrill's No. 1, Nail Puller, 50¢ doz.
 \$20.00 50¢
 Pearson No. 1, Cyclone Spike Puller,
 each \$30.00 50¢
 Scranton, Case Lots 50¢
 No. 2B (large) 50¢
 No. 3B (small) 50¢
 Smith & Hemenway Co.:
 Diamond B, case lots, 50¢ doz. Large,
 \$9.00; Small, \$7.50 50¢
 Giant No. 1, 50¢ doz. \$18.00; No. 1 1/2,
 \$18.50; No. 3, \$15 33 1/4%
 Staple Pullers, Utica and Davi-
 son 60¢
 Parrot Tack and Stub Puller, 50¢ doz.
 75¢; 50¢ gr. 90¢

Pulleys, Single Wheel—
 Inch 1/4 1/4 3 3
 Avoing or Tackle 1/4 1/4 3 3
 doz. \$0.30 45 60 1.05
 Hay Fork, Sirel or Solid Eye,
 doz., 4 in., \$1.25; 5 in., \$1.55
 Hot House, doz. \$0.65 85 1.20
 Inch 1/4 1/4 3 3
 Screw, doz. \$0.16 19 25 30
 Inch 1/4 1/4 3 3
 Side, doz. \$0.25 40 55 80
 Inch 1/4 1/4 3 3

Stowell's:
 Ceiling or End, Anti-Friction, 60¢ @ 10¢
 Dumb Waiter, Anti-Friction, 60¢ @ 10¢
 Electric Light 60¢
 Side, Anti-Friction 60¢ @ 10¢
Sash Pulley
 Common Frame, Square or
 Round End, per doz. 1 1/2 and
 2 in. 16¢ @ 15¢
 Auger Mortise, no Face Plate,
 per doz. 1 1/2 and 2 in. 16¢ @ 15¢
 Acme, No. 35, 1 1/2 in., 18 1/4¢; 2 in., 20 1/4¢
 Fox-All-Steel, Nos. 3 and 7, 2 in. 50¢
 Grand Rapids All Steel Noiseless, 50¢
 Ideal 70¢
 Niagara, No. 25, 1 1/2 in., 18 1/4¢; 2 in.,
 20 1/4¢ 50¢
 No. 25, Troy, 1 1/2 in., 14 1/4¢; 2 in., 16 1/4¢
 Star, No. 25, 1 1/2 in., 18 1/4¢; 2 in., 20 1/4¢
 Tackle Blocks—See Blocks.

Pumps—
 Clatren 60¢
 Pitcher Spout 75¢ @ 75¢ & 10¢
 Wood Pumps, Tubing, &c. 45¢ @ 50¢
 Barnes Dbl. Acting (low list) 45¢ @ 10¢
 Barnes Pitcher Spout 75¢ @ 10¢

Contractors' Rubber Diaphragm No.
 2, 1/2 & L. Block Co. \$16.00
 Daisy Spray Pump 50¢ doz. \$6.50
 Flint & Walling's, Fast Mail Hand,
 (low list) 50¢
 Flint & Walling's Fast Mail (low
 list) 50¢
 Flint & Walling's Tight Top Pitcher,
 75¢ @ 10¢
 National Specialty Mfg. Co., Measur-
 ing, Nos. 2, \$6.00; 3, \$3.50 30¢
 Myers' Pumps (low list) 45¢
 Myers' Power Pumps 45¢
 Myers' Spray Pumps 45¢

Pump Leathers—
 Plunger and Lower Valve—Per
 gro.:
 Inch 2 2 1/2 2 3/4 2 1/2 2 3/4
 \$2.20 2.50 2.75 3.00
 Inch 3 3 1/4 3 1/2 3 3/4 4
 \$3.30 3.60 3.85 4.10 4.40
Plunger Cup Leathers—Per 100:
 Inch 2 1/2 3 3 1/2 4
 \$2.75 3.85 5.00 6.00

Punches—
 Saddlers' or Drive, good
 doz. 50¢ @ 75¢
 Spring, single tube, good qual-
 ity \$1.75 @ 2.00
 Revolving (4 tubes)
 doz. \$3.50 @ 3.75

Bemis & Call Co.'s Cast St'l Drive 50¢
 Morrill's Nos. 1AA, 1A, 1B, 1C,
 15.00 50¢
 Hercules, 1 die, each \$5.00 50¢
 Niagara Hollow Puncher 40¢
 Niagara Solid Punches 55¢ @ 10¢
 Wm. Schollhorn Co.:
 Belt and Ticket, Bernard, 33 1/4%;
 Paragon, 30%; Lodi 50¢
 Timmer, Hollow P., S. & W. Co., 33 1/4%;
 Timmer's Solid P., S. & W. Co., 33 1/4%;
 doz., \$1.44 50%

Rail—Barn Door, &c.—
 Sliding Door, Painted Iron
 2 1/2 @ 2 3/4

Sliding Door, Wrought Brass—
 1 1/2 in., 1 lb., 36¢ 30¢
 Allish Mfg. Co.: Reliable Hanger
 Track 50¢
 Cronk's:
 Double Braced Steel Rail, 50¢ ft. 3 1/4¢
 O. N. T. Rail 3¢
 Hinge Rail 39¢

Griffin's:
 100 ft. 1 x 3-16 in., \$3.00;
 1/2 x 3-16 in., 3.50;
 Hinged Hanger, 100 ft., 1 x 3-16
 in., \$3.10; 1/2 x 3-16 in., \$3.80.
 Lays:
 Hinged Track, 100 ft., 1 in., \$3.40;
 1 1/2 in., \$3.96.
 O. N. T., 100 ft., 1 in., \$3.00; 1 1/2
 in., \$3.60; 1 1/2 in., \$4.00.
 Standard, 1 1/2 in., 100 ft. \$4.00
 Lawrence Bros.:
 100 ft. No. 201, \$4.00; No. 202, \$4.00
 New York, 1 x 3-16 in., 100 ft. \$3.00
 McKimney's:
 Hinged Hanger Rail, 50¢ ft., 1 1/2¢ 50¢
 None Better 30¢ ft. 3 1/4¢
 Standard 50¢ ft. 4¢
 Myers' Stayer Track, 50¢ ft. 60¢ & 50¢
 Richards' Mfg. Co.:
 Common, 1 x 3-6 in., \$3.00; 1 1/2 x
 3-16, \$3.25; 1 1/2 x 3-16, \$3.50.
 Special Hinged Hanger Rail, 60¢ @ 10¢
 Lag Screw Rail, No. 65 50¢
 Gauge Trolley Track, 50¢ ft., No. 31,
 9¢; No. 32, 14¢; No. 33, 20¢
 No. 50 60¢ @ 10¢
 Nos. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64,
 \$4.00; 45, \$3.25; 46, \$3.50; 49, No. 1,
 \$3.25; 49, No. 2, \$3.50.
 Stowell's:
 Cast Rail, Plain 50¢ ft. 2 1/4¢
 Steel Rail, Plain 25¢
 Wrought Bracket, 1 3-16 in., 50¢ ft. 3¢
 Wrought Bracket, 1 1/2 x 5-16, 50¢ ft. 1¢
 Set's Hyle, 50¢ ft. 11¢ 60¢
 P. L. Steel Rail, 100 ft. \$3.00
 No. 0, 1 x 3-16 100 ft. \$3.00

Rakes—
 NOTE.—Many goods are sold
 at net prices.
 Fort Madison Red Head Lawn \$3.25
 Fort Madison Blue Head Lawn \$2.70
 Jackson Lawn, 20 and 30 teeth, 50¢
 doz., net \$4.25
 Crown 50¢
 New Champion Garden, 50¢ doz., 12
 teeth, \$15.00; 14, \$16.50; 16, \$18.00. 75¢
 Victor Garden, 50¢ doz., 12 teeth,
 \$15.00; 14, \$16.50; 16, \$18.00 80¢
 Queen City Lawn, 50¢ doz., 20 teeth,
 \$2.50; 21, \$3.00 net
 Antelope Lawn, 50¢ doz. \$4.00
 Malleable Garden 70¢ @ 10¢
 Ideal Steel Garden, 50¢ doz., 12 teeth,
 \$15.00; 14, \$16.00; 16, \$18.00 80¢
 Kohler's:
 Lawn Queen, 20-teeth 50¢ doz. \$2.90
 Lawn Queen, 24-teeth 50¢ doz. \$3.00
 Paragon, 20-teeth 50¢ doz. \$2.70
 Paragon, 24-teeth 50¢ doz. \$2.75
 Steel Garden, 14-teeth 50¢ doz. \$2.40
 Malleable Garden, 14-teeth, 50¢ doz.
 \$1.75 @ 2.00

Rasps, Horse—
 Diston's 75¢
 Heller Bros. 70¢ & 50¢ @ 10¢ & 5¢
 Livered Bros.' Gold Model, 70¢ @ 75¢
 McCaffrey's American Star 10¢
 New Nicholson 70¢ @ 10¢ & 75¢
 See also Files.

Razors—
 Liana Bo-ras-c 60¢
 Fox Razors, 50¢ doz., No. 42, \$10.00;
 No. 44, \$20.00; No. 42, Platina, }
 50¢
 Red Devil 50¢
 Silberstein:
 Carbo Magnetic, \$2.00; Griffin No. 65,
 \$15.00; 63.50; Griffin No. 00, \$12.00;
 all other Razors 40%
Safety Razors—
 Kampfe Bros.:
 Star Safety, 25%; Star Interchange-
 able, 25%; Star Safety Corn, 25%.
 Silberstein 40%

Reels, Fishing—
 Hendryx:
 M. Q. 6, A. 6, B. 6, M. 9 1/4, M. 16,
 O. 16, A. 16, B. 16, 4008, Rubber,
 Popolo, Niekelo Popolo 20%

Aluminum German Silv., Bronze 25¢
 1240 N. 124 N. 20¢
 3004 N. 06 N. 6 RM. G 9 25¢
 4 N. 6 PN. 21 N. 26 PN. 20¢
 2904 P. 33 1/4%; 2904 PN. 33 1/4%; 0924 N.
 33 1/4%; 02084 N. 33 1/4%; 002504 PN.
 33 1/4%; 802 N. 33 1/4%;
 988 PN. 2904 N. 974 PN. 25¢
 5009 PN. 5009 N. 20¢
 Competitor, 102 P. 102 PN. 202 P.
 202 PN. 102 PR. 202 PR. 20¢
 304 P. 304 PN. 00304 P. 00304 PN. 33 1/4%
Registers—List July 1, 1903.
 Japanned, Electroplated and
 Bronzed 66 2/3¢
 White Porcelain Enamel 60¢
 Solid Brass or Bronze Metal,
 40¢ @ 10%

Revolvers—
 Single Action 95¢ @ \$1.00
 Double Action, except 4 1/2 in. \$1.80
 Double Action, 4 1/2 caliber \$2.00
 Automatic \$3.50
 Hammerless \$4.00

Riddles, Hardware Grade
 16 in. per doz. \$2.50 @ \$2.75
 17 in. per doz. \$2.75 @ \$3.00
 18 in. per doz. \$3.00 @ \$3.25

Rings and Ringers—
 Bull Rings—
 2 1/2 3 1/4 3 1/2 3 3/4 3 1/2 3 3/4 3 1/2 3 3/4
 Steel \$0.70 0.75 0.80 doz.
 Copper \$1.15 1.35 1.75 doz.
 Reas Improved Self-Piercing, 50¢;
 Copper, 2 in., \$1.25; 2 1/2 in., \$1.50;
 3 in., \$1.75.
 Hog Rings and Ringers—
 Hill's Rings, gro. boxes \$1.00 @ \$1.50
 Hill's Ringers, Gray Iron
 doz. 50¢ @ 55¢
 Hill's Ringers, Malleable Iron
 doz. 70¢ @ 75¢
 Blair's Rings per gro. \$1.75 @ \$2.25
 Blair's Ringers, per doz. \$0.60 @ 65¢
 Brown's Rings per gro. \$5.00 @ \$5.50
 Brown's Ringers, per doz. \$0.60 @ 65¢

Rivets and Burrs—
 Copper 33 1/4¢ @ 35¢
 Carriage, Coopers', Tinner's, &c.:
 Black 70¢ @ 10¢
 Metallic Tinned 70¢
Bifurcated and Tubular—
 Assorted in Boxes.
 Bifurcated, per doz. boxes, paste-
 board boxes, 23¢ @ 25¢; Tin boxes,
 29¢ @ 32¢.
 Tubular, per doz. boxes, 59 count,
 1/2 in.; 100 count, 51¢ @ 55¢.

Rollers—
 Acme, Stowell's Anti-Friction 50¢
 Cronk's Stay No. 65, \$0.90; No.
 60 \$1.00
 Cronk's Brinkerhoff No. 55, \$0.80;
 No. 56 \$0.84
 Lane's Stay 40¢
 Richards' Stay:
 Handy Adj. and Reversible No. 53, 75¢
 O. K. Adj. and Reversible No. 58, 50¢
 Lag Screw, Nos. 55 and 57 50¢
 Underwriters', Nos. 59, 60 50¢
 Favorite, No. 54 60¢
 Stowell's Barn Door Stay, 50¢ doz. \$1.00
 Swett's Anti-Friction 50¢
 Screw and Spike Stay, 50¢ doz. 65¢
 Hinge Adjustable Stay, 50¢ doz. 90¢

Rope—
 Manila, 7-16 in. diam. and larger:
 Pure 1 lb. 13¢ @ 13 1/2¢
 Sisal, 7-16 in. diam. and larger:
 Pure 1 lb. 9 1/4¢
 Sisal, 7-16 in. diam. and larger:
 No. 2 quality 1 lb. 7 1/2¢ @ 8¢
 Sisal, Hay, Hide and Bale
 Ropes, Medium and Coarse:
 Mixed 1 lb. 7 1/4¢ @ 8¢
 Pure 1 lb. 9 1/4¢
 Sisal, Tarred, Medium Lath
 Pure 1 lb. 7 1/4¢
 Yarn, Coarse and Untarred:
 Mixed 1 lb. 7 1/4¢ @ 8¢
 Pure 1 lb. 8¢
 Cotton Rope:
 Best, 1/4-in. and larger 18¢ @ 20¢
 Medium, 1/4-in. and larger 16¢ @ 17¢
 Common, 1/4-in. and larger 10¢
 In coils, 1/2¢ advance.

Wire Rope—
 Galvanized 37 1/4¢ @ 40¢
 Plain 35¢ @ 40¢
Ropes, Hammock—
 Covert Mfg. Co.:
 Jute, 35%; Sisal 20%

Rules
 Bowwood 60¢ @ 60¢ & 10¢
 Ivory 35¢ @ 10¢ & 10¢ & 5¢
 Chapin-Stephens Co.:
 Boxwood 60¢
 Flexfold 40¢
 Ivory 25¢ @ 25¢ & 10¢
 Miscellaneous 35¢ @ 50¢
 Stephens' Combination 55¢
 Stationers' 10¢
 Keuffel & Esser Co.:
 Folding, Wood 35¢ @ 10¢
 Folding, Steel 33 1/4¢ @ 10¢
 Luffkin's Steel 50¢ @ 10¢
 Luffkin's Lumber 60¢
 Stanley R. & L. Co.:
 Boxwood 60¢
 Ivory 45¢
 Miscellaneous 40¢
 Zig Zag, Pin Joint 42 1/2¢
 Unson Nut Co.:
 Boxwood 60¢ @ 10¢
 Ivory 35¢ @ 10¢ & 10¢ & 10¢

Sash Balances—
 See Balance, Sash.
Sash Locks— See Locks, Sash.
Sash Weights—
 See Weights, Sash.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Saws—**

Atkins:	
Circular	45%
Band	50% 50% 10%
Butcher Saws	50%
Cross Cuts	35%
One-Man Cross Cut	40%
Narrow Cross Cut	50%
Hand, Rip and Panel	35%
Miter Box and Compass	40%
Mulay, Mill and Drag	45%
Unap-Stephens Co.:	
Turning Saws and Frames	30% 30% 10%
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	50% 10% 10%
Disston's:	
Circular, Solid and Ins'ted Tooth	50%
Band, 2 to 18 in. wide	50%
Hand, 1/4 to 1 1/2	40%
Crosscuts	45%
Narrow Crosscuts	45%
Mulay, Mill and Drag	50%
Framed Woodsaws	50%
Woodsaw Blades	25%
Woodsaw Bods, Tinned	15%
Hand Saws, Nos. 12, 99, 9, 16, 4100	25%
D8, 120, 76, 77, 8	25%
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1	25%
0, 0, Combination	25%
Compass, Key Hole, &c.	25%
Butcher Saws and Blades	30%
C. E. Jennings & Co.'s:	
Back Saws	25%
Butcher Saws	30%
Compass and Key Hole Saws	35%
Framed Wood Saws	35%
Hand Saws	20%
Wood Saw Blades	35%
Millers Falls:	
Butcher Saws	15% 10%
Star Saw Blades	15% 10%
Massachusetts Saw Works:	
Victor Kitchen Saws	40% 10% 50%
Butcher Saws and Blades	35% 40%
Peace & Richardson's Hand Saws	30%
Simonds':	
Circular Saws	40%
Crescent Ground Cross Cut Saws	30%
One-Man Cross Cuts	40% 10%
Gang Mill, Mulay and Drag Saws	45%
Band Saws	35%
Back Saws	25% 25% 1/4%
Butcher Saws	35% 35% 1/4%
Hand Saws	35%
Hand Saws, Bay State Brand	45%
Compass, Key Hole, &c.	25% 25% 1/4%
Wood Saws	40% 1/2%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws	50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A & A	25%
Disston's:	
Concave Blades	25%
Keystone Blade	30%
Hack Saw Frames	30%
Simonds' File Co.	35%
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180	40%
Hack Saws, Nos. 175, 180, complete	40%
Goodell's Hack Saw Blades	40% 10%
Griffin's Hack Saw Blades	35% 45% 10%
Griffin's Hack Saw Blades	35% 45% 10%
Star Hack Saw and Blades	35% 45% 10%
Sterling Hack Saw Blades	30% 10% 45%
Sterling Hack Saw Frames	30% 10% 45%
Sterling Power Hack Saw Machines	each, No. 1, \$25.00; No. 2, \$30.00. 10%
Victor Hack Saw Blades	30%
Victor Hack Saw Frames	30%

Scroll—

Barnes, No. 1, \$15	40%
Barnes' Scroll Saw	40%
Barnes' Velociped Power Scroll Saw	with boring attachment, \$20. 25%
Lester, complete, \$10.00	15% 10%
Rogers, complete, \$3.50 and \$4.00	15% 10%

Scrapers—

Family, Turnbulla's	50% 50% 10%
Counter:	
Hatch, Platform, 1/4 oz. to 4 lbs.	dos. \$2.00 to \$5.00
Two Platforms, 1/4 oz. to 8 lbs.	dos. \$5.00
Union Platform, Plain \$1.70 to \$1.90	
Union Platform, Std. \$1.85 to \$2.15	
Chattillon's:	
Eureka	25%
Favorite	20%
Crocker's Trip Scissors	50%
Chicago Scale Co.:	
The Little Detective	25 lbs 50%
Union or Family No. 2	50%
Portable Platform (reduced list)	50%
Wagon or Stock (reduced list)	50%
The Standard Portable	45%
The Standard R. R. and Wagon	50% 10%

Scrapers—

Box, 1 Handle	dos. \$2.00 to \$2.25
Box, 2 Handle	dos. \$2.50 to \$2.80
Ship	Light \$2.00; Heavy \$2.50
Adjustable Box Scraper (S. R. & L. Co.)	\$6.00
Chapin-Stephens Co. Box	30% 30% 10%

Screws—Bench and Hand

Bench, Iron, dos., 1 in.	\$2.50
2 1/2; 1 1/2, \$3.00 to \$3.25; 1 1/4, \$3.50 to \$3.75	
Bench, Wood	20% 20% 10%
Hand, Wood	20% 20% 10%
R. Bliss Mfg. Co. Hand	20% 20% 10%
Chapin-Stephens Co. Hand	20%
Coach, Lag and Hand Rail—Lag, Cone Point, list Oct. 1	75% 15%
Coach, Gimlet Point, list Oct. 1 '99	75% 10%
Hand Rail, list Jan. 1, '81	70% 10% 75%

Jack Screws—

Standard List	70% 10% 75%
Millers Falls	50% 10% 10%
P. S. & W.	50%
Swett Iron Works	75% 30%

Machine—

List Jan. 1, '98:	
Flat or Round Head, Iron, Brass or Bronze	50% 60% 10%
Fillister Head, Iron, Brass or Bronze	40% 60% 10%

Set and Cap—

Set (Iron)	75% 10% 75%
Set (Steel), net advance over Iron	25%
Sq. Hd. Cap	70% 10% 75%
Hex. Hd. Cap	70% 10% 75%
Rd. Hd. Cap	50% 75%
Fillister Hd. Cap	60% 75%

Wood—

List July 23, 1903:	
Flat Head, Iron	87% 45% 10%
Round Head, Iron	85% 50%
Flat Head, Brass	80% 50%
Round Head, Brass	77% 45% 10%
Flat Head, Bronze	75% 50%
Round Head, Bronze	72% 45% 10%
Drive Screws	87% 45% 10%

Scroll Saws—

See Saws, Scroll.

Scythes—

Grass, No. 1, Plain	\$6.25 to \$6.75
Clipper, Bronzed Webb	\$6.50 to \$7.00
No. 3 Clipper, Pol'd Webb	\$6.75 to \$7.25
No. 6 Clipper and Solid Steel	\$7.00 to \$7.50
Bush, Weed and Bramble, No. 2	\$6.50 to \$7.00
Grain, No. 1	\$8.25 to \$8.75
Bronzed Webb, No. 1	\$8.50 to \$9.00
Nos. 3 and 4 Clipper, Grain	\$8.75 to \$9.25
Solid Steel, No. 6	\$9.25 to \$9.75

Seeders, Raisin—

Enterprise 25% 30%

Sets—Awl and Tool—

Fray's Adj. Tool Handles, Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9; 5, \$7	50%
C. E. Jennings & Co.'s Model Tool Holders	30%
Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; No. 5, \$18	15% 10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Sake and Shovel 40% doz sets \$9.00

Sets, Nail—

Octagon	gro. \$3.50 to \$3.75
Buck Bros	27 1/2%
Cannon's Diamond Point	40% doz, \$12

Shingles, Metal—Per Sq.

Edwards Mfg. Co.:	
Painted	Galv.
14 x 20	\$1.25 \$6.00
10 x 14	4.50 6.25
7 x 10	1.75 6.50
Wheeling Corrugating Co.:	
Dixie, 14 x 20 in.	\$4.25 \$5.50
Dixie, 10 x 14 in.	4.50 6.00
Dixie, 7 x 10 in.	5.00 6.75

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:	
Iron	per keg \$4.10
Steel	per keg \$3.85
Burden's, all sizes	per keg \$3.90

Shot—

Drop, up to B	25-lb. bag. \$1.95
Drop, B and larger	2.20
Buck	2.20
Chilled	2.20
Dust	2.40

Shovels and Spades—

Association List, Nov. 15, 1902. 40%

Snow Shovels—

Long Handle \$2.75 to \$3.00

Wood and Mail, D. Handle \$3.25 to \$3.50

Sieves and Sifters—

Hunter's Imitation gro. \$9.50 to \$10.00

Hunter's Genuine—

per gro. \$12.00 to \$12.50	
Buffalo Metallic Blue, R. M. Co., 18 x 20	\$13.20
16 x 18	\$13.50
14 x 16	\$14.00

Sieves, Seamless Metallic—

Mesh	14 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 inch	
Mesh 18, Nested	dos. \$0.90 to \$0.95
Mesh 20, Nested	dos. \$1.00 to \$1.05
Mesh 24, Nested	dos. \$1.30 to \$1.40

Sinks, Cast Iron—

Painted, Standard list:	
12 x 12 to 22 x 36 in.	60%
20 x 40 to 24 x 50 in.	50%
24 x 60 to 24 x 120 in.	50%

Barnes' low list:

Up to and including 20 x 36 in.	50%
20 x 40 to 24 x 50 in.	45%
NOTE—There is not entire uniformity in lists used by jobbers.	

Skels, Wagon—

Cast Iron	70% to 75% 10%
Steel	40% to 45%

Slates, School—

Factory Shipments.

"D" Slates 50% to 50% 10%

Eureka, Unexcelled Noiseless 60% 5% 10%

Victor A. Noiseless 60% 5% 10%

Slaw Cutters—See Cutters.**Snaps, Harness—**

German	40% to 40% 10%
Coat, 25%: Yankee, 30% 2%; Yankee Roller, 30% 2%	
High Grade, 40%; Trojan	40%
Jockey	25%
Onida Community	60% 5%
Harness Snaps, 1 inch	60% 5%
Swivel Snaps	50%
Snaths	50%
Scythe	50%

John T. Henry Mfg. Co.:

Pruning Shears, all grades	40%
P. S. & W. Co.	30%
Wilkinson Shear & Cutlery Co.	50% 10%
Hedge Wileut Brand	50% 10%
Lawn and Border, Wileut Brand	60% 10%

Sheaves—Sliding Door—

Stovell's Anti-Friction	50%
Reading	40%
R. & E. list	15%
Wrightsville Hatfield Pattern	87%

Sliding Shutter—

Reading list 40%

Shells—Shells, Empty—

Brass Shells, Empty

Climax, 10 and 12 gauge 65% 10%

Club, Rival, 65% 5%; First Quality 60% 5%

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge 25% 10%

Climax, 10 and 12 gauge: Acme, 10, 12, 16 and 20 gauge: Ideal, 10, 12, 16 and 20 gauge: Leader grade 25% 5%

Union, League, 12 and 12 gauge: Rival Grade 25%

New Climax, Defiance, 10, 12, 14, 16 and 20 gauge: Climax, 14, 16 and 20 gauge: League, Union, 14, 16 and 20 gauge: Repeater Grade 20%

Expert, 10, 12, 16 and 20 gauge 35% 5%

Robin Hood, Low Brass 30% 5%

Robin Hood, High Brass 30% 5%

Indian, for Black Powder 25% 5%

Shells, Loaded—

Loaded with Black Powder 40%

Loaded with Smokeless Powder, medium grade 40% 5%

Loaded with Smokeless Powder, high grade 40% 10% 10%

Robin Hood:

Smokeless Robin Hood, Low Brass 40% 10%

Smokeless Comets, High Brass 40% 10% 10%

Indian, Black Powder 40% 5%

Union Metallic Cartridge Co.:

New Club, Black Powders 40%

Nitro Club, Smokeless Powders 40% 5%

Arrow, Smokeless Powders 40% 10% 10%

Winchester:

Smokeless Repeater Grade 40% 5%

Smokeless Leader Grade 40% 10% 10%

Black Powder 40%

Shingles, Metal—Per Sq.

Edwards Mfg. Co.:

Painted Galv.

14 x 20 \$1.25 \$6.00

10 x 14 4.50 6.25

7 x 10 1.75 6.50

Wheeling Corrugating Co.:

Dixie, 14 x 20 in. \$4.25 \$5.50

Dixie, 10 x 14 in. 4.50 6.00

Dixie, 7 x 10 in. 5.00 6.75

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:

Iron per keg \$4.10

Steel per keg \$3.85

Burden's, all sizes per keg \$3.90

Shot—

25-lb. bag.

Drop, up to B \$1.95

Drop, B and larger 2.20

Buck 2.20

Chilled 2.20

Dust 2.40

Shovels and Spades—

Association List, Nov. 15, 1902. 40%

Snow Shovels—

Long Handle \$2.75 to \$3.00

Wood and Mail, D. Handle \$3.25 to \$3.50

Sieves and Sifters—

Hunter's Imitation gro. \$9.50 to \$10.00

Hunter's Genuine—

per gro. \$12.00 to \$12.50

Buffalo Metallic Blue, R. M. Co., 18 x 20 \$13.20

16 x 18 \$13.50

14 x 16 \$14.00

Sieves, Seamless Metallic—

Per dozen.

Mesh 14 16 18 20

Iron Wire \$1.05 1.05 1.10 1.20

Tinned Wire \$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 inch

Mesh 18, Nested dos. \$0.90 to \$0.95

Mesh 20, Nested dos. \$1.00 to \$1.05

Mesh 24, Nested dos. \$1.30 to \$1.40

Sinks, Cast Iron—

Painted, Standard list:

12 x 12 to 22 x 36 in. 60%

20 x 40 to 24 x 50 in. 50%

24 x 60 to 24 x 120 in. 50%

Barnes' low list:

Up to and including 20 x 36 in. 50%

20 x 40 to 24 x 50 in. 45%

NOTE

Stoppers, Bottle—			
Victor Bottle Stoppers.....	gro.	\$9.00	
Stops—Bench—			
Millers Falls.....	15	10%	
Morrill's, No. 1.....	doz.	\$10.00	
Morrill's, No. 2.....	doz.	\$12.50	
Doz—			
Chapin-Stephens Co.....	60	60	10%
Chapin-Stephens Co.....	20		
Straps—Box—			
Carr's Universal, case lots.....	20	10	10%
Stretchers, Carpet—			
Cast Iron, Steel Points, doz.	60	60	10%
Socket.....	doz.	\$1.00	
Bullard, do.....	doz.	\$4.00	
Excelsior Stretcher and Tack Hammer Combined.....	doz.	\$6.00	
Woven Fence—			
Franklin.....	ea.	\$3.75	
Strops, Razor—			
Star Diagonal Strop.....	doz.	\$2.50	
Stuffers, Sausage—			
Enterprise Mfg. Co.....	25	25	7 1/2%
National Specialty Co., list Jan. 1902.....	30	45	
Sweepers, Carpet—			
Bissell Carpet Sweeper Co.: doz.			
Superba, Crotch Mahogany.....	doz.	\$36.00	
Triumph, Fancy Veneers.....	doz.	\$33.00	
Parlor Queen, Figured Rosewood.....	doz.	\$30.00	
Elite, Hungarian Ash.....	doz.	\$29.00	
American Queen, Figured Mahogany.....	doz.	\$27.00	
Ideal, Bird's-Eye Maple.....	doz.	\$25.00	
Grand Rapids, Nickel.....	doz.	\$24.00	
Japan.....	doz.	\$22.00	
Standard, Nickel.....	doz.	\$22.00	
Crown Jewel, Nickel.....	doz.	\$21.00	
Japan.....	doz.	\$19.00	
Crystal, Glass Top.....	doz.	\$18.00	
Grand, 17 in. wide.....	doz.	\$16.00	
Club, 24 in. wide.....	doz.	\$16.00	
Hall, 28 in. wide.....	doz.	\$16.00	
National Sweeper Co.: doz.			
Louis XV, Roller Bearing, Gold Plated.....	doz.	\$120.00	
Hepplewhite, Roller Bearing, Silver Plated.....	doz.	\$72.00	
Sheraton, Roller Bearing, N'kel.....	doz.	\$60.00	
Ye Mission, Roller Bearing, Gilded Copper.....	doz.	\$36.00	
Transparent, Roller Bearing, Plate Glass top, Nickel.....	doz.	\$36.00	
National Queen, Roller Bearing, Fancy Veneers.....	doz.	\$27.00	
Loyal, Roller Bearing, Veneers, Nickel.....	doz.	\$25.00	
Triple Medal, Roller Bearing, Nickel.....	doz.	\$24.00	
Marion, Roller Bearing, N'kel.....	doz.	\$24.00	
Marion Queen, Roller Bearing, Nickel.....	doz.	\$24.00	
Monarch, Roller Bearing, N'kel.....	doz.	\$24.00	
Monarch, Roller Bearing, Jap.....	doz.	\$20.00	
Perpetual, Regular B'rgs, Jap.....	doz.	\$18.00	
Monarch Extra (17 in. case), Roller Bearing.....	doz.	\$36.00	
Monarch Extra (17 in. case), Roller Bearing, Japanned.....	doz.	\$33.00	
Auditorium (26 in. case), Roller Bearing, Nickel.....	doz.	\$54.00	
Mammoth (30 in. case), Roller Bearing, Nickel.....	doz.	\$90.00	
NOTE—Rebates: 50c per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$2.50 per dozen on twenty-five-dozen lots.			
Streator Metal Stamping Co.:			
Eureka Japanned.....	doz.	\$15.00	
Model R, Sanitaire.....	doz.	\$25.00	
Model A, Sterling.....	doz.	\$26.00	
Model B, Sterling, Nickel.....	doz.	\$23.00	
Model B, Sterling, Japanned.....	doz.	\$21.00	
Model C, Sterling.....	doz.	\$21.00	
Model D, Sterling.....	doz.	\$19.50	
Tacks, Finishing Nails, &c.			
New List, May 1, 1906.			
American Carpet Tacks.....	90	25	
American Cut Tacks.....	90	25	
Succed's Cut Tacks.....	90	25	
Succed's Upholsterers.....	90	25	
Gimp Tacks.....	90	25	
Lace Tacks.....	90	25	
Trimmers' Tacks.....	90	25	
Looking Glass Tacks.....	65		
Bill Posters' and Railroad Tacks.....	90	10	
Hungarian Nails.....	80	10	
Finishing Nails.....	70		
Trunk and Clout Nails.....	80		
NOTE—The above prices are for Standard Weights.			
Miscellaneous—			
Double Pointed Tacks.....	90	4	or 5 tens
See also Nails, Wire			
Tanks, Oil and Gasoline—			
Each.....			
R. M. Co.: Oil.....			
Gal. Emerald.....			
30.....		\$3.40	Queen City
60.....		\$4.25	\$4.50
Wilson & Friend Co.: Oil.....			
Gal. Gasoline.....		\$3.00	
30.....		\$2.75	
60.....		\$2.50	\$4.00
120.....		\$5.00	\$5.75
Tapes, Measuring—			
American Asses' Skin.....	50	—	
Patent Leather.....	25	30	45%
Steel.....	35	1	5-65%
Chesterman's.....	25	25	65%
Keuffel & Esser Co.: do.....	10	10	50%
Favorite, Ass Skin.....	40	10	50%
Favorite, Duck and Leather.....	25	50	25%
Metallic and Steel, lower list.....	35	45	
3-45%; Pocket, 35@35-45%.			

Lufkin's:		40	10	50%	
Asses' Skin.....		30	30	45%	
Metallic.....		25	35	10%	
Patent Bend, Leather.....		40	40	45%	
Pocket.....		33	4	35%	
Steel.....					
Wiebusch & Hilger:					
Chesterman's Metallic, No. 34L.....		25			
etc.....		25			
Chesterman's Steel, No. 1038L.....		35			
etc.....		35			
Teeth, Harrow—					
Steel Harrow Teeth, plain or headed, 1/2-inch and larger.....		per 100 lbs.	\$2.75	\$3.00	
Thermometers—					
Tin Case.....	80	10	80	10	45%
Ties, Bale—Steel Wire—					
Single Loop.....	80	10	45%		
Monitor, Cross Head, 1/2 in. dia.....	70	2	1/2%		
Brick Ties—					
Niagara Brick Ties.....	25	10			
Tinners' Shears, &c.—					
See Shears, Tinners', &c.					
Tinware—					
Stamped, Japanned and Pieced, sold very generally at net prices.					
Tire Benders, Upsetters, &c.					
See Benders and Upsetters, Tire.					
Tools—Coopers'—					
L. & I. J. White.....	20	20	45%		
Haying—					
Myers' Hay Tools.....	45				
Stowell's Hay Carriers, 50% Hay Forks, 50%; Fork Pulleys, 50%.					
Miniature—					
Smith & Hemenway Co.'s, Davidson.....	25				
Saw—					
Atkins' Cross Cut Saw Tools.....	35	45			
Simonds' Improved.....	35	45			
Simonds' Crescent.....	35	45			
Ship—					
L. & I. J. White.....	25				
Transom Lifters—					
See Lifters, Transom.					
Traps—Fly—					
Balloon, Globe or Acme, doz.	\$1.15	\$1.25	gro. \$11.50	\$12.00	
Harper, Champion or Paragon, doz.	\$1.25	\$1.40	gro. \$13.00	\$13.50	
Game—					
Imitation Onocida.....	70	10			
Newhouse.....	35	45			
Hawley & Norton.....	70	10			
Victor.....	70	10			
Onocida Community Jump.....	50				
Mouse and Rat—					
Mouse, Wood, Choker, doz. holes	12				
Mouse, Round or Square Wire, doz.	85	90			
Marty French Rat and Mouse Traps (Genuine):					
No. 1, Rat, 1/2 doz., \$13.25; case of 24.....					
No. 2, Rat, 1/2 doz., \$11.50; case of 24.....					
No. 3, Rat, 1/2 doz., \$6.50; case of 50.....					
No. 3 1/2, Rat, 1/2 doz., \$5.25; case of 72.....					
No. 4, Mouse, 1/2 doz., \$3.85; case of 150.....					
No. 5, Mouse, 1/2 doz., \$3.00; case of 150.....					
Trimmers, Spoke—					
Wood's E I.....	50				
Trowels					
Disston Brick and Pointing.....	25				
Disston Plastering.....	25				
Disston "Standard Brand" and Gardner Trowels.....	30				
Kohler's Steel Garden Trowels, 1/2 in. dia., \$4.80; 6 in., \$6.00; 8 in., \$7.00; 10 in., \$8.00; 12 in., \$9.00; 14 in., \$10.00; 16 in., \$11.00; 18 in., \$12.00; 20 in., \$13.00; 22 in., \$14.00; 24 in., \$15.00; 26 in., \$16.00; 28 in., \$17.00; 30 in., \$18.00; 32 in., \$19.00; 34 in., \$20.00; 36 in., \$21.00; 38 in., \$22.00; 40 in., \$23.00; 42 in., \$24.00; 44 in., \$25.00; 46 in., \$26.00; 48 in., \$27.00; 50 in., \$28.00; 52 in., \$29.00; 54 in., \$30.00; 56 in., \$31.00; 58 in., \$32.00; 60 in., \$33.00; 62 in., \$34.00; 64 in., \$35.00; 66 in., \$36.00; 68 in., \$37.00; 70 in., \$38.00; 72 in., \$39.00; 74 in., \$40.00; 76 in., \$41.00; 78 in., \$42.00; 80 in., \$43.00; 82 in., \$44.00; 84 in., \$45.00; 86 in., \$46.00; 88 in., \$47.00; 90 in., \$48.00; 92 in., \$49.00; 94 in., \$50.00; 96 in., \$51.00; 98 in., \$52.00; 100 in., \$53.00; 102 in., \$54.00; 104 in., \$55.00; 106 in., \$56.00; 108 in., \$57.00; 110 in., \$58.00; 112 in., \$59.00; 114 in., \$60.00; 116 in., \$61.00; 118 in., \$62.00; 120 in., \$63.00; 122 in., \$64.00; 124 in., \$65.00; 126 in., \$66.00; 128 in., \$67.00; 130 in., \$68.00; 132 in., \$69.00; 134 in., \$70.00; 136 in., \$71.00; 138 in., \$72.00; 140 in., \$73.00; 142 in., \$74.00; 144 in., \$75.00; 146 in., \$76.00; 148 in., \$77.00; 150 in., \$78.00; 152 in., \$79.00; 154 in., \$80.00; 156 in., \$81.00; 158 in., \$82.00; 160 in., \$83.00; 162 in., \$84.00; 164 in., \$85.00; 166 in., \$86.00; 168 in., \$87.00; 170 in., \$88.00; 172 in., \$89.00; 174 in., \$90.00; 176 in., \$91.00; 178 in., \$92.00; 180 in., \$93.00; 182 in., \$94.00; 184 in., \$95.00; 186 in., \$96.00; 188 in., \$97.00; 190 in., \$98.00; 192 in., \$99.00; 194 in., \$100.00; 196 in., \$101.00; 198 in., \$102.00; 200 in., \$103.00; 202 in., \$104.00; 204 in., \$105.00; 206 in., \$106.00; 208 in., \$107.00; 210 in., \$108.00; 212 in., \$109.00; 214 in., \$110.00; 216 in., \$111.00; 218 in., \$112.00; 220 in., \$113.00; 222 in., \$114.00; 224 in., \$115.00; 226 in., \$116.00; 228 in., \$117.00; 230 in., \$118.00; 232 in., \$119.00; 234 in., \$120.00; 236 in., \$121.00; 238 in., \$122.00; 240 in., \$123.00; 242 in., \$124.00; 244 in., \$125.00; 246 in., \$126.00; 248 in., \$127.00; 250 in., \$128.00; 252 in., \$129.00; 254 in., \$130.00; 256 in., \$131.00; 258 in., \$132.00; 260 in., \$133.00; 262 in., \$134.00; 264 in., \$135.00; 266 in., \$136.00; 268 in., \$137.00; 270 in., \$138.00; 272 in., \$139.00; 274 in., \$140.00; 276 in., \$141.00; 278 in., \$142.00; 280 in., \$143.00; 282 in., \$144.00; 284 in., \$145.00; 286 in., \$146.00; 288 in., \$147.00; 290 in., \$148.00; 292 in., \$149.00; 294 in., \$150.00; 296 in., \$151.00; 298 in., \$152.00; 300 in., \$153.00; 302 in., \$154.00; 304 in., \$155.00; 306 in., \$156.00; 308 in., \$157.00; 310 in., \$158.00; 312 in., \$159.00; 314 in., \$160.00; 316 in., \$161.00; 318 in., \$162.00; 320 in., \$163.00; 322 in., \$164.00; 324 in., \$165.00; 326 in., \$166.00; 328 in., \$167.00; 330 in., \$168.00; 332 in., \$169.00; 334 in., \$170.00; 336 in., \$171.00; 338 in., \$172.00; 340 in., \$173.00; 342 in., \$174.00; 344 in., \$175.00; 346 in., \$176.00; 348 in., \$177.00; 350 in., \$178.00; 352 in., \$179.00; 354 in., \$180.00; 356 in., \$181.00; 358 in., \$182.00; 360 in., \$183.00; 362 in., \$184.00; 364 in., \$185.00; 366 in., \$186.00; 368 in., \$187.00; 370 in., \$188.00; 372 in., \$189.00; 374 in., \$190.00; 376 in., \$191.00; 378 in., \$192.00; 380 in., \$193.00; 382 in., \$194.00; 384 in., \$195.00; 386 in., \$196.00; 388 in., \$197.00; 390 in., \$198.00; 392 in., \$199.00; 394 in., \$200.00; 396 in., \$201.00; 398 in., \$202.00; 400 in., \$203.00; 402 in., \$204.00; 404 in., \$205.00; 406 in., \$206.00; 408 in., \$207.00; 410 in., \$208.00; 412 in., \$209.00; 414 in., \$210.00; 416 in., \$211.00; 418 in., \$212.00; 420 in., \$213.00; 422 in., \$214.00; 424 in., \$215.00; 426 in., \$216.00; 428 in., \$217.00; 430 in., \$218.00; 432 in., \$219.00; 434 in., \$220.00; 436 in., \$221.00; 438 in., \$222.00; 440 in., \$223.00; 442 in., \$224.00; 444 in., \$225.00; 446 in., \$226.00; 448 in., \$227.00; 450 in., \$228.00; 452 in., \$229.00; 454 in., \$230.00; 456 in., \$231.00; 458 in., \$232.00; 460 in., \$233.00; 462 in., \$234.00; 464 in., \$235.00; 466 in., \$236.00; 468 in., \$237.00; 470 in., \$238.00; 472 in., \$239.00; 474 in., \$240.00; 476 in., \$241.00; 478 in., \$242.00; 480 in., \$243.00; 482 in., \$244.00; 484 in., \$245.00; 486 in., \$246.00; 488 in., \$247.00; 490 in., \$248.00; 492 in., \$249.00; 494 in., \$250.00; 496 in., \$251.00; 498 in., \$252.00; 500 in., \$253.00; 502 in., \$254.00; 504 in., \$255.00; 506 in., \$256.00; 508 in., \$257.00; 510 in., \$258.00; 512 in., \$259.00; 514 in., \$260.00; 516 in., \$261.00; 518 in., \$262.00; 520 in., \$263.00; 522 in., \$264.00; 524 in., \$265.00; 526 in., \$266.00; 528 in., \$267.00; 530 in., \$268.00; 532 in., \$269.00; 534 in., \$270.00; 536 in., \$271.00; 538 in., \$272.00; 540 in., \$273.00; 542 in., \$274.00; 544 in., \$275.00; 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758 in., \$382.00; 760 in., \$383.00; 762 in., \$384.00; 764 in., \$385.00; 766 in., \$386.00; 768 in., \$387.00; 770 in., \$388.00; 772 in., \$389.00; 774 in., \$390.00; 776 in., \$391.00; 778 in., \$392.00; 780 in., \$393.00; 782 in., \$394.00; 784 in., \$395.00; 786 in., \$396.00; 788 in., \$397.00; 790 in., \$398.00; 792 in., \$399.00; 794 in., \$400.00; 796 in., \$401.00; 798 in., \$402.00; 800 in., \$403.00; 802 in., \$404.00; 804 in., \$405.00; 806 in., \$406.00; 808 in., \$407.00; 810 in., \$408.00; 812 in., \$409.00; 814 in., \$410.00; 816 in., \$411.00; 818 in., \$412.00; 820 in., \$413.00; 822 in., \$414.00; 824 in., \$415.00; 826 in., \$416.00; 828 in., \$417.00; 830 in., \$418.00; 832 in., \$419.00; 834 in., \$420.00; 836 in., \$421.00; 838 in., \$422.00; 840 in., \$423.00; 842 in., \$424.00; 844 in., \$425.00; 846 in., \$426.00; 848 in., \$427.00; 850 in., \$428.00; 852 in., \$429.00; 854 in., \$430.00; 856 in., \$431.00; 858 in., \$432.00; 860 in., \$433.00; 862 in., \$434.00; 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970 in., \$488.00; 972 in., \$489.00; 974 in., \$490.00; 976 in., \$491.00; 978 in., \$492.00; 980 in., \$493.00; 982 in., \$494.00; 984 in., \$495.00; 986 in., \$496.00; 988 in., \$497.00; 990 in., \$498.00; 992 in., \$499.00; 994 in., \$500.00; 996 in., \$501.00; 998 in., \$502.00; 1000 in., \$503.00; 1002 in., \$504.00; 1004 in., \$505.00; 1006 in., \$506.00; 1008 in., \$507.00; 1010 in., \$508.00; 1012 in., \$509.00; 1014 in., \$510.00; 1016 in., \$511.00; 1018 in., \$512.00; 1020 in., \$513.00; 1022 in., \$514.00; 1024 in., \$515.00; 1026 in., \$516.00; 1028 in., \$517.00; 1030 in., \$518.00; 1032 in., \$519.00; 1034 in., \$520.00; 1036 in., \$521.00; 1038 in., \$522.00; 1040 in., \$523.00; 1042 in., \$524.00; 1044 in., \$525.00; 1046 in., \$526.00; 1048 in., \$527.00; 1050 in., \$528.00; 1052 in., \$529.00; 1054 in., \$530.00; 1056 in., \$531.00; 1058 in., \$532.00; 1060 in., \$533.00; 1062 in., \$534.00; 1064 in., \$535.00; 1066 in., \$536.00; 1068 in., \$537.00; 1070 in., \$538.00; 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1172 in., \$589.00; 1174 in., \$590.00; 1176 in., \$591.00; 1178 in., \$592.00; 1180 in., \$593.00; 1182 in., \$594.00; 1184 in., \$595.00; 1186 in., \$596.00; 1188 in., \$597.00; 1190 in., \$598.00; 1192 in., \$599.00; 1194 in., \$600.00; 1196 in., \$601.00; 1198 in., \$602.00; 1200 in., \$603.00; 1202 in., \$604.00; 1204 in., \$605.00; 1206 in., \$606.00; 1208 in., \$607.00; 1210 in., \$608.00; 1212 in., \$609.00; 1214 in., \$610.00; 1216 in., \$611.00; 1218 in., \$612.00; 1220 in., \$613.00; 1222 in., \$614.00; 1224 in., \$615.00; 1226 in., \$616.00; 1228 in., \$617.00; 1230 in., \$618.00; 1232 in., \$619.00; 1234 in., \$620.00; 1236 in., \$621.00; 1238 in., \$622.00; 1240 in., \$623.00; 1242 in., \$624.00; 1244 in., \$625.00; 1246 in., \$626.00; 1248 in., \$627.00; 1250 in., \$628.00; 1252 in., \$629.00; 1254 in., \$630.00; 1256 in., \$631.00; 1258 in., \$632.00; 1260 in., \$633.00; 1262 in., \$634.00; 1264 in., \$635.00; 1266 in., \$636.00; 1268 in., \$637.00; 1270 in., \$638.00; 1272 in., \$639.00; 1274 in., \$640.00; 1276 in., \$641.00; 1278 in., \$642.00; 1280 in., \$643.00; 1282 in., \$644.00; 1284 in., \$645.00; 1286 in., \$646.00; 1288 in., \$647.00; 1290 in., \$648.00; 1292 in., \$649.00; 1294 in., \$650.00; 1296 in., \$651.00; 1298 in., \$652.00; 1300 in., \$653.00; 1302 in., \$654.00; 1304 in., \$655.00; 1306 in., \$656.00; 1308 in., \$657.00; 1310 in., \$658.00; 1312 in., \$659.00; 1314 in., \$660.00; 1316 in., \$661.00; 1318 in., \$662.00; 1320 in., \$663.00; 1322 in., \$664.00; 1324 in., \$665.00; 1326 in., \$666.00; 1328 in., \$667.00; 1330 in., \$668.00; 1332 in., \$669.00; 1334 in., \$670.00; 1336 in., \$671.00; 1338 in., \$672.00; 1340 in., \$673.00; 1342 in., \$674.00; 1344 in., \$675.00; 1346 in., \$676.00; 1348 in., \$677.00; 1350 in., \$678.00; 1352 in., \$679.00; 1354 in., \$680.00; 1356 in., \$681.00; 1358 in., \$682.00; 1360 in., \$683.00; 1362 in., \$684.00; 1364 in., \$685.00; 1366 in., \$686.00; 1368 in., \$687.00; 1370 in., \$688.00; 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CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:	
1 to 1 1/4 in. round and square.....	per lb 2.10¢
1 1/2 to 4 in. x 3/4 to 1 in.....	per lb 2.30¢
1 1/2 to 4 in. x 1 to 5/16.....	per lb 2.30¢
Rods—1/2 and 11-16 round and square.....	
Angles:	Cts per lb
3 in. x 1/4 in. and larger.....	2.40¢
3 in. x 3/16 in. and 1/2 in. (except 3/4 in. and 4 x 1/4 2.50¢)	2.65¢
1 1/2 to 2 1/2 in. x 3/4 in.....	2.45¢
1 1/2 to 2 1/2 in. x 3/16 in. and thicker.....	2.40¢
1 to 1 1/4 in. x 3/16 in.....	2.45¢
1 to 1 1/4 x 1/2 in.....	2.50¢
2 1/2 x 1/2 in.....	2.65¢
2 1/2 x 3/4 in.....	2.75¢
3 1/2 x 1/2 in.....	3.00¢
4 x 3/2 in.....	4.30¢
Teas:	
1 in.....	2.75¢
1 1/4 in.....	2.55¢
1 1/2 to 2 1/2 in.....	2.45¢
3 in. and larger.....	2.50¢
Beams:	
Channels, 3 in. and larger.....	2.40¢
Hands—1 1/2 to 4 x 3/16 to No. 8.....	2.45¢
"Burden's Best" Iron, base price.....	3.10¢
Burden's "H. B. & S." Iron, base price.....	3.10¢
"Ulster".....	3.10¢
Norway Bars.....	3.40¢
Norway Shapes.....	3.90¢

Merchant Steel from Store—

Bessemer Machinery.....	per lb 2.10¢
Toe Calk, Tire and Sleigh Shoe.....	2.50¢ to 3.00¢
Best Cast Steel, base price in small lots.....	7¢

Sheets from Store—

Black

	One Pass, C.R.	R. G.
	Soft Steel.	Cleaned.
No. 14.....	per lb 2.35¢	3.10¢
No. 18 to 21.....	per lb 3.15¢	3.10¢
No. 27.....	per lb 3.20¢	3.50¢
No. 28.....	per lb 3.30¢	3.60¢

Russia, Planished, &c.

Genuine Russia, according to assort- ment.....	per lb 11 1/4¢ to 14¢
Patent Planished.....	per lb A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16.....	per lb 3.35¢
Nos. 22 to 24.....	per lb 3.75¢
No. 27.....	per lb 4.30¢
No. 28.....	per lb 4.45¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Tin Plates—

American Charcoal Plates (per box.)

A.A.A. Charcoal:	
IC, 14 x 20.....	\$6.00
IX, 14 x 20.....	7.85

A. Charcoal:	
IC, 14 x 20.....	\$5.65
IX, 14 x 20.....	6.75

American Coke Plates—Bessemer—

IC, 14 x 20.....	108 lb.....\$4.65
IX, 14 x 20.....	5.65

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating.....	\$9.00
IX, 20 x 28 with an 8 lb. coating.....	11.00

Seamless Brass Tubes—

List December 4, 1905.....	Base price 27¢.
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Brass Tubes, Iron Pipe Sizes—

List December 4, 1905.....	Base price 27¢
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Copper Tubes—

List December 4, 1905.....	Base price 33¢
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Brazen Brass and Bronze Tubes—

List June 6, 1898.....	Add to List 5¢ to 9¢
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High Brass Rods—

List June 6, 1898.....	Add to List 1¢ to 2¢
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Roll and Sheet Brass—

List June 6, 1898.....	Add to List 3¢ to 5¢
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METALS—

Tin—

Straits Pig.....	per lb 44¢ to 44 1/2¢
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Copper—

Lake Ingot.....	nominal	per lb 26¢ to 26 1/2¢
Electrolytic.....	per lb 25¢ to 25 1/4¢	
Casting.....	per lb 24 1/4¢ to 24 1/2¢	

Sheet Copper Hot Rolled, 16 oz.....	per lb 32¢ to 34¢
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Sheet Copper Cold Rolled, 1¢ per lb advance over Hot Rolled.....	per lb 33¢ to 35¢
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Sheet Copper Polished 20 in. wide and under, 1¢ ad- vance over Cold Rolled.....	
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Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.....	
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Bottoms, Fits and Flats.....	per lb 34¢ basis
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Planished Copper, 1¢ per lb more than Polished.....	
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Spelter—

Western.....	per lb 7¢ to 7 1/2¢
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Zinc.

No. 9, base, caaks, per lb 9.1¢ Open.....	per lb 9.60¢
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Lead.

American Pig.....	per lb 6 1/2¢ to 6 3/4¢
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Bar.....	per lb 7 1/4¢ to 7 1/2¢
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Solder.

1/2 & 1/2, guaranteed.....	per lb 26¢ to 26 1/2¢
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No. 1.....	per lb 24¢ to 24 1/2¢
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Refined.....	per lb 20 1/2¢ to 21 1/4¢
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Prices of solder indicated by private brand vary ac-
cording to composition.

Antimony—

Cookson.....	per lb 22¢
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Halletts.....	per lb 21¢
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Other Brands.....	18¢ to 19 1/2¢
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Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:	
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Small lots.....	nominal.
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100-lb lots.....	nominal.
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Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents—
Copper, Heavy and Wire.....	per lb 18.5¢ to 19.00¢
Copper, Light and Bottoms.....	per lb 10.50¢ to 17.00¢
Brass, Heavy.....	per lb 12.75¢ to 13.25¢
Brass, Light.....	per lb 11.00¢ to 11.50¢
Heavy Machine Composition.....	per lb 16.25¢ to 16.50¢
Clean Brass Turnings.....	per lb 12.50¢ to 13.75¢
Composition Turnings.....	per lb 14.50¢ to 14.75¢
Lead, Heavy.....	per lb 5.00¢
Lead, Light.....	per lb 4.70¢
Zinc Scrap.....	per lb 4.70¢
No. 1 Yard Wrought, Long.....	\$15.25¢ to 15.75¢
No. 1 Yard Wrought, Short.....	\$15.00¢ to 15.50¢
Wrought Pipe.....	\$12.50¢ to 13.00¢
No. 1 Machinery Cast.....	\$8.25¢ to 17.25¢
Stove Plate.....	\$14.00¢ to 14.50¢

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades,
and a standard authority on all matters relating to those branches of industry.

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Subscription, postpaid, \$5.00 a year.

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